SOCIAL LOAFING IN TEAM SPORTS:

AN EVALUATION OF THE

COLLECTIVE EFFORT MODEL

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CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABSTRACT

The phenomenon of social loafing has been shown to be detrimental to group productivity. The present research examined social loafing in the context of team sports, while also providing an investigation into the validity of the Collective Effort Model (CEM) from within this framework. Participants were members of established sports teams, and were required to perform a running task individually and as a member of a relay. Situational variables were manipulated such that participants performed under conditions of low or high identifiability and low or high task valence. The results revealed support for the robustness of the social loafing and its generalisability to the domain of team sports. Furthermore, partial support was demonstrated for the CEM. These findings and their implications were discussed in terms their relevance to the existing body of social loafing literature and group process theory in general.

CHAPTER I

INTRODUCTION AND THEORETICAL CONTEXT

Valued goals are often obtained by the combined efforts of more than one individual, that is, by virtue of the formation and action of groups. Many exigencies, ranging across the spectrum of needs from basic indispensable physiological and existence requirements to higher order personal growth and social needs, are often only achievable by means of collective action. Individuals within a given society rely on groups to protect them from attack, disease and economic instability to name but a few basic necessities. These same individuals also use groups such as clubs and religious institutions to fulfil the more complex requirements of social interaction, awareness and personal development.

Steiner (1972) asserted that the efficiency of functioning of the individual within the structures and institutions of society is frequently enhanced if tasks are performed by groups. Such a claim is difficult to dispute given the plethora of relevant examples readily observable in everyday life. For instance, few would contend that the formation of a production line is not a more efficient means of assembling a motor vehicle than an individual performing all the separate tasks alone. However, examination of the relationship between the individual and the group from a different perspective can provide critical insight. Given that, within favourable circumstances, the individual can benefit from the formation of groups, does it also hold true that the group will benefit from the inclusion of the individual? Obviously, without more than one individual, the group will cease to exist, but beyond this questions can be asked pertaining to the efficiency of groups relative to the resources of each member. Do groups function as effectively as they have the potential to? In other words, what is the relationship between the productivity of the group as a whole and that of the sum of the individuals who comprise that group? In essence, the problem becomes one of identifying the effects of the group existence on individual functioning within the group context. As such, the present research will investigate the role of the group environment on individual performance.

The effect of a group environment on individual action has been a focal point of theory and research since the origins of social loafing. In the first social psychology,

experiment Triplett (1898) found effects whereby individuals exerted more effort when working in the presence of others than when compared to working alone. Such an effect has since been replicated on a multitude of occasions (Bond & Titus, 1983) and been coined 'social facilitation'. Earlier research by Ringelmann[1] (see Kravitz & Martin, 1986) demonstrated a contrary effect. Ringelmann found a decrease in individual effort when working in groups, and that the magnitude of this effect tended to increase as the size of the group increased. This finding, that is the inverse relationship between group size and individual productivity has since been termed 'social loafing'[2] (Latané, Williams & Harkins, 1979).

It can be seen from even the earliest investigations in the area that individuals do not necessarily behave in the same manner when they are alone as when they are members of a group. The productivity level of an individual is subject to change if that individual is working in the presence of others. This change has been attributed to influences on the individual's motivation and subsequent effort as a consequence of being in the group environment. However, the characteristics of such changes in performance are not consistent. A simple comparison between social loafing and social facilitation effects illustrates this point. Social loafing research has shown that working together in groups leads to decreased performance levels compared to working alone. In contrast, facilitation studies have shown opposite effects, working together increased productivity when compared to working alone, (Harkins, 1987).

Williams, Karau and Bourgeois (1993) suggested that this apparent anomaly could be accounted for in terms of how the individual perceives the other group members: either as sources or co-targets of social influence. This difference can be made more explicit by examining the dominant research paradigms used to investigate these two phenomena. As the two effects have traditionally been treated as separate research domains (Harkins, 1987), separate methodologies have been applied. The essential distinction between the two lines of research regards the nature of the performance conditions employed. Inherent to most social facilitation studies is the comparison

[1]Although chronologically Ringelmann's research occurred before that of Triplett, it is generally not considered the first instance of a social psychological experiment as it was not published until 1913, (Kravitz and Martin, 1986).

[2]Originally this effect was known as the Ringelmann Effect, but was subsequently re-conceptualised as social loafing, (Latané, Williams & Harkins, 1979).

between working individually and working coactively. Alternatively social loafing research tends to compare coactive performance with collective performance, (Jackson & Williams, 1985). Coaction refers to an individual working in the presence of others without combining inputs to form a cumulative output, that is, independently. For example, athletes competing in a marathon are performing coactively. Collective performance involves individuals combining their efforts with others to produce a pooled output. A choir performs collectively. Collective action is the combination of individual inputs to produce a singular output, rather than a series of equivalent, parallel outputs from each individual.

Karau and Williams (1993) noted that for both coactive and collective performance, the presence of others may be real or imagined. This implies that it is not the physical presence of others, rather the perception of such by the performer. An individual will still experience the same presence effects regardless of whether or not they are actually part of a group, as long as they perceive themselves to be. These perceptions also extend to the nature of the influence the other actors present have on the individual in question. When a task is coactive, others are generally perceived to be sources of influence. Their presence can act as a source of arousal (Zajonc, 1965), while also providing a potential for evaluation to occur, (Cottrell, 1972). Thus, individuals performing in a coactive setting are subject to heightened arousal resulting from the presence of coactors; the coactors are influencing the individual. Alternatively, when a task is being performed collectively, other group members tend to be perceived as not as sources of influence, but as co-targets of influence. The same forms of influence may operate in both coactive and collective performance, however for the latter condition other group members act as targets rather than origins of this influence. In this manner the impact of the social influence is spread across the members of the group, thereby reducing the amount of influence experienced by each member, (Latané, 1981). Hence, it follows that conceptually, the typical social facilitation paradigm (comparing individual to coactive performance) implicitly results in an increase in perceived social influence from the first performance condition to the second, while social loafing research (comparing individual to collective performance) results in a perceived decrease in the amount of social influence experienced. Given that, in the context of

group performance, social influence is seen to have a motivating effect (Steiner, 1972); it follows that the inherent differences between the two paradigms are producing varying levels of this influence which relate directly to the degree of productivity changes found. Thus, the effects generally found by means of these lines of research don't appear to be contrary as such, but to some extent an artefact of the dominant paradigms employed.

Common to both the typical social facilitation and social loafing paradigms is a comparison between either coactive or collective performance and performing alone. As such individual performance acts as a type of baseline measurement to which group based performance is compared. In this manner, any changes in individual performance that occur within a group context have a reference point with which to compare, that is individual performance. Thus, an avenue for investigation in this area could focus on the group, and the effects of performing in a group context on individual productivity and performance.

In order to examine more precisely the effects of the group on the individual, it is necessary to identify and characterise the nature of the group conditions within which individual productivity levels change. Steiner (1972) identified three categories of variables, which determine the quality of productivity levels when individuals perform a given task alone, coactively or collectively: task demands, resources and process.

Task Demands

The demands that a certain task presents the performer(s) with are analogous with what is required to optimally perform the task. Included within these demands is detail of the equipment, materials, knowledge and procedures required to complete the task. This information will in turn, provide a description of performance requirements. It will prescribe how (or if) a given resource is relevant, the best means of application of this resource for optimal outcome, and what particular applications of these resources are permitted for a given task. The nature of the task will naturally determine its particular demands, which have been classified according to three basic constructs (Steiner, 1972):

(i) Divisibility: whether a task can be divided into subtasks (i.e. divisible) which can be performed by different individuals, or at different times; or whether the entire task can only be performed by one person (i.e. unitary). For example,

building a house is a divisible task; different functions can be performed by different individuals without effecting the outcome. Alternately, driving a car can only be performed by one person at a time, thus making it a unitary task.

(ii) Nature of Output: whether the task requires quantity (i.e. maximising) or quality (i.e. optimising) as its performance outcome. A power lifter performs maximally. Success is governed by the sheer amount of weight lifted. Alternatively, a neurosurgeon is required to perform with extreme accuracy, that is, optimally.

(iii) Permitted Process: how individual efforts can be combined to produce an output. Additive tasks require individual contributions to be summed together to produce an output. An archery team's score would be the sum of the individual member's scores. Compensatory tasks prescribe that the group product is the average of individual inputs. In reality few tasks are strictly compensatory in nature, however some groups choose to determine the product of their efforts in this manner; for example, a company may budget for expenses by averaging individuals' estimations. A disjunctive task requires an either/or type product such that one person's input, usually that of the best, fastest, or most productive individual, is sanctioned by others and used as a representative output. Conjunctive tasks require group output to be the result of the group member who performs least well, with all members contributing. For example, a pair competing in a 'three-legged' race comply by necessity with the demands of conjunctive tasks or else risk falling over. Finally, discretionary tasks allow performers to co-ordinate efforts as they choose; allowing some factors or group members to have differing levels of input. Members of a group may all vote on the result of their productivity, or may allocate particular individuals to decide what the group output should be. For example, the population of a country may decide on a national issue by means of a referendum as opposed to the election of a government to do so.

Any given task can be classified along on the basis of these three categories and with this classification comes a description of task demands. As task demands differ so do the requirements of the participants. In order to perform a divisible, optimising, disjunctive task successfully for example, it is required that the task be performed by more than one person, with a high level of task-specific accuracy, with an output that

takes the form of the best individual performance. For example, a lawn bowls four perform competitively under such conditions. All four team members must contribute separately, successful performance requires quality rather than quantity and outcome is determined on the basis of the contribution of the most successful group member (i.e. the closest bowl to the jack at the end of play). On the other hand, the task demands confronting a rowing eight prescribe quite a different set of required resources. In this context, performance takes on the characteristics of a unitary, maximising, additive task. Each individual performs all parts of the rowing stroke[3]; each stroke is expected to propel the boat, as far forward as possible; and output is the result of the combination of all individual inputs.

Thus, it can be seen that the nature of the demands presented by a task specifies the characteristics of performance required in order for such performance to be of an optimal level. Any given task presents a specific set of task demands, and it the congruence between these requirements and to what extent they are met by the performer(s) in the context of performance that determines performance efficacy.

Resources

Resource variables refer to the various skills, abilities, knowledge, tools and the like possessed by the task performer(s) that are relevant to the task at hand. Relevance is determined by the criteria stipulated as task demands, however these two determinants of productivity are virtually always independent of each other[4]. The demands of the task specify what is required to perform the task at an optimal level, while resources refers to the relevant attributes possessed by the performer(s). The resources possessed by a group can be considered as the product of the combination of the resources possessed by the individuals of whom the group is comprised.

If task demands and resources can be determined prior to the performance of a task, it is possible to predict productivity level. The overlap between these two variables, that is, the relevant resources possessed by the actors and the requirements presented by the

[3] In this case, more than one individual is able to perform a unitary task. All group members perform call parts of the task simultaneously thereby creating a situation of *parallel* performance, (Steiner, 1972).

[4] The exception to this situation will occur when group membership is determined on the basis of a pre-requisite ability requirement, whereby resources may be seen to be a result of task demands.

task, will determine the maximum level of productivity that is achievable. Steiner (1972) refers to this notion as *potential productivity*. If both task demands and available resources are identified then it is possible to infer potential productivity.

If the resources possessed by the performer of the task match those prescribed by the task demands, completion of the task is therefore possible. A lack of resources does not necessarily preclude task performance; rather productivity levels and the level of accuracy will decrease relative to the amount of resources available. For example, a chess player does not need to be a 'grandmaster' in order to play, but his or her performance will not be at the level of someone who has reached 'grandmaster' status. A total absence of relevant resources will typically mean an inability to perform a given task. In general, a straightforward comparison between task demands and resources will determine potential productivity levels.

Process

It is often assumed that if relevant resources are available, a task will be achieved. If the performer(s) possess the resources, the task should be performed at a maximal level of productivity. Unfortunately, this is often not the case. Actual productivity, that is the true productivity level exhibited, frequently does not reach the level theoretically possible. For example, a committee of five will not necessarily make five times the number of decisions, or even one decision five times the quality of that any one individual may make. Steiner (1972) attributes this phenomenon to process loss. Process consists of the behaviours exhibited in order to perform the task at hand. This refers to the actions by which the performer applies their resources to complete the task, and can include both productive and counter-productive activity. If the strategies employed to apply resources to satisfy task demands are not the best available, process loss will occur.

Process can not be evaluated prior to task performance, as it is an ongoing series of behaviours, each influenced by the result of those previous. Any given part of process, that is, any given application of resources to meet task demands, will also have influence on the behaviours that ensue. In short, process is continual, with the current situation determined somewhat by that which has already occurred, which will in turn influence that to follow. The magnitude of such influence will vary between situations

due to variables such as the nature of the task, environmental influences and the like. A gymnast performing a floor exercise, for example, will be limited as to what manoeuvres he or she may attempt by their finishing state from the exercise immediately past. For instance, they may have run out of space or be unbalanced, which will in turn limit what they can do for the following movements.

Process becomes inherently more complex when the task at hand is being undertaken collectively. In a group situation process will include the pooled efforts of the team members, as well as the interpersonal communications and co-ordinations between individuals engaging in the task. Such exchanges add to the complexity. Groups must decide how best to organise their resources, combine their efforts and generally co-ordinate members such that task demands are met and productivity is high. Alternatively, the individual performer avoids such complications as he or she only need decide which of their resources are relevant and how to apply them, without having to co-ordinate with other team members. Because of the lack of the requirement to co-ordinate process between group members, individual performance provides less opportunity for process inefficiencies. Thus there is less potential for process loss among individual performers than groups, and furthermore, process loss will, theoretically, be greater for collective than for coactive performance due to the higher degree of co-ordination involved.

The combination of the three productivity determinant variables: task demands, resources and process, leads directly to the formation of a social combination rule, which specifies the outcome of task performance in terms of productivity level. Steiner (1972) expresses this epistemological relationship as:

1. ACTUAL PRODUCTIVITY (AP) = POTENTIAL PRODUCTIVITY (PP) – PROCESS LOSS

This equation models individual performance in a relatively straightforward manner. The level of performance exhibited will match that predicted as a potential, that is the result of the intersection between task demands and resources, to the extent that process is optimal for the task at hand. If the performer possesses the relevant resources and applies them in the most efficient manner, actual performance will approximate potential performance. The extent to which actual performance falls short of potential performance will reflect the degree of process loss experienced.

Applying Steiner's (1972) model of performance to collectively performed tasks, it can be assumed that the theoretical performance zenith for a given task performed by a group is the sum of the actual performance of the members performing the same task individually. Thus:

2. $PP_{Group} = \Sigma AP_{Individual}$

One major implication can be inferred from this relationship. As group size increases, potential productivity will also increase as a result of the associated increase in resources available. Naturally, a group of ten individuals will in theory, be able to achieve more than an equivalent group of only five members, particularly if the task in question is maximising in nature. However many group tasks, for example team sports, place a limit on the number of members who can participate at any given time. Increasing group size in these instances can also increase potential productivity. A soccer team that carries a squad of 20 players will have a larger pool of resources available to it, by means of individual members having different skills and abilities, than a team with fewer members. Accordingly, increasing group size will tend to increase potential productivity, but will also bring about productivity losses due to faulty process associated with the increase. As group size increases, so does the potential number of co-ordination links, that is interactions required between members, such that:

3. TOTAL NUMBER OF COORDINATION LINKS = $n (n-1)/2$

It is important to note that the number of co-ordination links present is not equivalent to the number of links 'used', only the number of potential links. Not all tasks require each group member to co-ordinate with each other group member; however, the nature of collective performance dictates that some degree of co-ordination must occur between group members. Assuming that each co-ordination link is less than perfect in terms of transfer of output, and thus results in some degree of decreased productivity, it follows that in a group situation, actual productivity will be less than the predicted potential productivity level. In this situation, it can be said that process loss has occurred as a result of increasing the number of co-ordination links, that is, the size of the group.

Steiner (1972) accounted for the loss in performance associated with an increase in group size in terms of process loss as per equation 1. However, Steiner also broke this relationship down further. A theoretical examination of the direct causes of process loss led to the notion of two separate components of process loss: co-ordination loss and motivation loss such that:

4. PROCESS LOSS = CO-ORDINATION LOSS + MOTIVATION LOSS

Steiner identified two distinct sources of process loss. The first, co-ordination loss has been discussed in terms of interaction between group members resulting in inefficient application of resources to meet task demands. The potential for co-ordination loss can be approximated as being positively, linearly related to group size. As the number of co-ordination links increases (as per equation 3), so does the opportunity for any one, or a number of these links to be less than perfect in terms of transfer of output. Thus, the potential for co-ordination loss increases as the size of the group increases.

The second component of process loss, that is motivation loss, results from group members' motivation to expend effort towards a group goal or outcome being less than optimal (Steiner, 1972). Motivation loss is a theoretical construct used to describe the phenomenon whereby individuals simply don't exert as much effort when performing in a group situation as when performing the same task alone. Consequently, process loss is increased which in turn creates disparity between potential and actual productivity; performance levels do not meet that theoretically possible. Motivation loss has been empirically demonstrated to be a real and valid phenomenon that can have negative impact on performance in a collective context (Ingham, Levinger, Graves & Peckham, 1974). In fact, motivation loss is the theorised antecedent of social loafing.

The consequences of either of these factors individually, or a combination of the two, can lead to decreases in the performance levels of individuals when working in groups. The nature of co-ordination loss, that is the fact that it is a tangible, quantifiable construct, indicates that it can be overcome. Once the source of co-ordination loss is identified, strategies can be devised and employed in order overcome the associated performance loss. Motivation loss, however, appears more problematic to performance. As a construct, motivation is generally seen as an internalised trait (Bandura, 1986). To this extent, it follows that motivation loss is also an internalised process. This is not to

claim that sources of motivation loss are necessarily internal, but that decrease in motivation itself is not a readily observable, quantifiable phenomenon. Given that motivation loss can have negative influences on performance, and it is, by its internal nature, difficult to objectively identify; it seems necessary to investigate in a more systematic manner.

A second implication of the concept of motivation loss relates to the functioning of the individual within a group context. The notion that the motives of an individual can be influenced by the presence of others indicates that the individual may be susceptible to the influence of the group. Coupled with this is the inference that the group may not necessarily gain full benefit from each group member to the extent that each individual may not contribute all of their resources to the group outcome. In other words, group existence can be seen to influence the functioning of the individual within a collective context, and this influence can be potentially detrimental to group performance.

Application of the concept of decreased individual efficiency within a group context yields a range of implications. The effectiveness of a spectrum of group situations is potentially compromised. Juries, construction crews, orchestras and study groups to name but a few examples are all potentially susceptible to process loss and more importantly the failure to reach the groups' potential for performance. One pertinent example is that of sports teams. If the individual athlete is prone to performing below potential when in a collective setting, that is a team environment, team performance will also suffer. Actual performance will not approximate potential performance. Given that the success of sports teams in a competitive context is in part judged on the basis of 'winning', and winning is dependant on performance; any impact on performance may also have an associated impact on success.

Carron (1988) applied Steiner's (1972) model of group effectiveness to the performance of sports teams. Given two hypothetical teams, 'A' and 'B' for instance, it can be inferred that 'A' will be more effective, that is perform better when competing against 'B', if one or more of the following conditions is met:

(i) 'A' possesses greater relevant resources and experiences fewer process losses.

(ii) 'A' possesses greater relevant resources and experiences approximately equal process losses.

(iii) 'A' possesses approximately equal relevant resources but experiences fewer process losses. (Adapted from Carron, 1988).

A further condition whereby 'A' would theoretically be more effective than 'B' also presents itself:

(iv) 'A' possesses fewer relevant resources, and experiences fewer process losses to the extent that the greater level of efficiency of process outweighs the relative lack of resources.

Team performance, in terms of productivity, can thus be seen to be dependent on the degree to which potential productivity is increased, and process loss is decreased, (Hardy, 1990). It follows that in order to increase the effectiveness of any given team in relation to its competitors, either the amount of relevant resources available must be increased, or the magnitude of process loss must be decreased. Resources can be increased relatively simply, for example, personnel can be changed, motor skills improved, knowledge increased and equipment modified. Furthermore, in a competitive situation, the amount of resources remains relatively constant; motor skills do not suddenly increase for example, they must be practised. Co-ordination loss, as a component of process loss, can also be overcome by means of identification of sources, and implementation of strategies designed to eliminate these deficiencies in process. The ostensive nature of these two elements of group effectiveness suggests that their effect on actual productivity levels is not fixed, and can be changed by means of physical interventions, for example physical practice of skills, education of individuals and the like.

The third factor that may influence productivity, motivation loss, is less tangible than either co-ordination loss or the amount of resources available. Consequently, motivation loss has the potential to be more problematic to performance due to its impalpable nature. Motivation loss must be decreased, or eliminated in order to decrease the amount of process loss experienced, thereby making actual productivity levels closer to potential productivity. In order to overcome motivation loss, the negative effects of the group environment on individual performance levels must be overcome. In other words, social loafing effects must be reduced or eliminated. By reducing the degree of the social loafing effect and therefore the motivation losses,

which accompany this phenomenon, teams can become more effective.

It can be seen that social loafing has negative effects on team performance. This indicates that any given sports team may be performing below their potential. Hardy (1990) noted that although a team will out-perform any one individual, the true potential for performance may not be reached unless process loss is controlled. This is frequently illustrated within a sporting context when teams comprising of highly talented individuals do not always make a highly talented team. Although a range of other social and performance based factors may contribute to this occurrence, social loafing can be seen to play a role in decreasing the relative efficiencies of sports teams. The net effect is that collective performance may result in individuals economising their effort, thereby reducing the efficiency of collective performance relative to performing alone.

Given the shortcomings central to the nature of collective action and its prevalence within everyday activity (Williams, Karau & Bourgeois, 1993), it seems necessary to investigate the phenomenon of social loafing and its applications. Identifying factors that influence social loafing, that is, determining what moderates the loafing effect in any given individual or group of individuals, will be of both theoretical and practical value. On a theoretical level, if the constructs and variables that contribute to the loafing effect can be identified, these can provide valuable insight into the processes and characteristics of motivation in individuals performing in collective situations. Such information may then serve to enhance understanding of why groups don't always perform to their potential. In turn, this may serve in a predictive capacity, allowing for identification of how a given individual will perform within a group situation. Ultimately, the formulation of interventions for overcoming the effects of social loafing will be possible, and with the implementation of such interventions will come increases in group performance and effectiveness.

CHAPTER II
LITERATURE REVIEW

The previous chapter provided a theoretical account of the effects of group activity on the performance of the individuals who make up the group. A large body of empirical research has been conducted in order to investigate such phenomena, and in particular the social loafing effect. The present chapter provides a review of the main contributions to this area.

A REVIEW OF THE SOCIAL LOAFING LITERATURE

Ringelmann (see Kravitz & Martin, 1986) first demonstrated productivity loss in groups when investigating the relative efficiencies of farm workers using various types of agricultural machinery between 1882 and 1887. Participants were required to pull on a rope attached to a measuring device that gauged the amount of pressure being exerted. Group size was manipulated such that participants were pulling on the rope alone, as dyads, triads, or as a group of eight. The results revealed the first empirical demonstration of process loss. As group size increased so did the discrepancy between actual performance and potential performance. The collective effort of the groups, was less than the sum of the individual performances. This performance loss approximated a negative linear relationship between group size and mean individual output. Individuals in dyads performed, on average, at 93% of their potential productivity, while in triads individuals performed at 85% of their potential and in groups of eight at only 49% of the level they were performing at alone. This effect, that is the inverse relationship between group size and individual productivity has since been termed the *Ringelmann Effect.*

Few details are known about the exact experimental procedures employed by Ringelmann, making precise replication difficult, however Ingham, Graves, Levinger and Peckham (1974) conducted a series of studies in order to empirically re-examine the findings. An approximate replication of Ringelmann's original investigation was undertaken employing groups ranging in size from 1 to 6. A rope pulling task was employed in which the force exerted could be quantified. Results revealed a loss in

actual productivity when compared to the predicted potential productivity levels. This effect was curvilinear in nature[5]; mean individual productivity levels dropped significantly when group size was increased from 1 to 2 and 3, however when group size was increased to 4, 5 and 6, the associated performance loss was not significant. Ingham et al. (1974) had thus demonstrated process loss associated with the increase of group size.

The second study of Ingham et al. (1974) demonstrated the role of motivation loss as a component of the process loss experienced in collective action. They employed the same rope-pulling paradigm as used in the first study, however this time participants were led to believe group size was being increased when in fact it was not. In order to achieve this, participants were required to pull on the rope within a group consisting exclusively of experimental confederates. The naïve participant was blindfolded and assigned to the first rope-pulling position. Pseudo-participants occupied the positions on the rope behind the naïve participant and were trained to produce the associated kinaesthetic feedback associated with performing the task without actually exerting any pressure. In this way, the participant was under the impression that they were performing in a group when in fact they were the only one pulling on the rope. "Only the individual's perception of group size was varied, while keeping constant the fact that he was really pulling alone," (Ingham et al., p.378). In this manner any potential for co-ordination loss was eliminated, as there was only one individual actually performing. Furthermore, this implies that any observed process loss was due to losses in motivation. Results revealed similar effects to that of study one. Individual performance decreased significantly when participants believed they were part of a group, although the size of the effect was smaller than for the first study. As there was no potential for co-ordination loss, it was concluded that a decrease in motivation due to a perceived increase in the number of co-workers in the group was responsible for the observed process loss. This phenomenon was later termed *social loafing*, (Latané, Williams & Harkins, 1979).

[5] Ingham et al., (1974) attribute the difference between the linear relationship found by Ringelmann, and the curvilinear relationship they found to be due to improved experimental design, particularly in terms of more rigid control and more precise measuring equipment.

Definitionally, social loafing refers to "the reduction in motivation and effort when individuals work collectively compared with when they work individually or coactively", (Karau & Williams, 1993, p.681). This definition incorporates two aspects of the loafing phenomenon. Firstly, it specifies the nature of the effect, that is, that an individual's level of motivation and consequently the amount of effort they exert will decrease. By extension of this notion, performance will also decrease as a result of a relative lack of effort. Secondly, the conditions whereby such a decrease in motivation will occur are stipulated. Social loafing occurs when individuals perform collectively. The standard to which collective performance is compared is either individual or coactive performance. This is not to imply that social loafing will necessarily occur when individual or coactive performance is compared to collective action, but that these are the conditions under which it may be manifested. Thus, in a more practical sense, social loafing can be operationalised as the difference between any observed process loss and the associated co-ordination loss.

In Ingham et al.'s (1974) original series of studies, confederates who were not participating observed the performance of the task. Thus as group size decreased, audience size increased introducing an extraneous variable of audience size, and thereby permitting social facilitation type explanations of the effect. Latané, Williams and Harkins (1979) provided a conceptual replication of the Ingham, et al. (1974) study, employing a clapping and shouting task in the place of rope pulling, and also controlling for audience size. Participants were required to clap and shout as loud as possible in groups of varying size (n=1, n=2, n=4 & n=6). Latané et al. (1979) controlled for the confounding factor of audience size present in Ingham et al.'s design, by simply keeping audience size constant. In order to control for co-ordination loss participants were again led to believe they were performing in groups when in fact they were performing alone. The results revealed significant productivity losses when individual performance in the group setting was compared to individual performance when performing alone. This effect was attributed to social loafing, or more correctly the subsequent lack of effort resulting from motivation loss. Thus Latané et al. (1979) were able to conclude that social loafing is a plausible, valid and empirically supported rationalisation for the productivity loss evident when individuals perform collectively.

Since the 1970s, there has been a steady flow of social loafing research, providing a relatively large body of empirical literature. From these studies, a coherent account of the characteristics of, and the processes, which contribute to, the effect has emerged. Karau and Williams (1993) conducted a meta-analytic synthesis of 78 studies within the social loafing paradigm to investigate the robustness, generalisability and moderating variables of the social loafing phenomenon. It was found that the social loafing effect was evident across 79% of studies reviewed, with a mean weighted effect size of all studies of d=0.44. This indicates that averaged over the range of studies reviewed, a social loafing effect was present; participants exerted more effort individually/coactively than collectively. The moderate size of this effect suggests that in magnitude, social loafing lies within a range comparable to a number of other prominent social psychological effects, most notably social facilitation (Bond & Titus, 1983; Eagly, 1987). When it is recognised that most of the studies included in the meta-analysis were designed to eliminate loafing to some degree, interpretation of the effect size lends even more weight to the robustness of the phenomenon.

Karau and Williams (1993) found social loafing to be generalisable across task domain, with the effect being reliably demonstrated for physical, cognitive, creative and evaluation tasks. Furthermore, it was also reported the social loafing was present across varying populations, with the majority of studies finding significant results regardless of participants' sex, culture or age.[6]

In addition, Karau and Williams (1993) also identified a large number of variables which had been shown to moderate the loafing effect. Grouping conceptually similar variables together, it was found that group size, evaluation potential, task valence, group valence, expectation of co-worker performance, uniqueness of individual inputs, and task difficulty were all significant moderators of the social loafing effect. Each of these moderators will be considered below.

Group Size

In line with Steiner's (1972) theory and model of group process, group size has been shown to be positively related to social loafing, (e.g. Ingham et al., 1974; Kerr & Bruun,

[6] Although sex and culture revealed consistently significant effects, the effect size was smaller for females and participants from Eastern cultures, (Karau & Williams, 1993).

1981, 1983; Latané, Williams & Harkins, 1979; Petty, Harkins, Williams & Latané, 1977; Weldon & Mustari, 1988; Williams, Harkins & Latané, 1981). Karau & Williams (1993) reported that their meta-analysis yielded significant simple linear regression effects which indicated that not only group size, but the number of group members actually performing the task was positively related to the degree of social loafing exhibited.

Evaluation Potential

Identifiability, or the potential for individual productivity within a collective performance setting to be evaluated, has been shown to influence social loafing (Hardy & Latané, 1986; Harkins & Jackson, 1985; Kerr & Bruun, 1981; Waller, 1996 Williams, Harkins & Latané, 1981). When there is no perceived potential for the individual to be evaluated when performing collectively there is a tendency for loafing to be exhibited, (Karau & Williams, 1993). These findings indicate that evaluation potential is a mediator of social loafing, consistent with claims made by Harkins (1987).

Williams et al. (1981) conducted a study whereby participants were asked to produce noise by cheering in groups of varying sizes. The paradigm incorporated a pseudo-group condition within which individuals believed they were performing collectively, but in reality were performing alone. Social loafing effects were demonstrated; participants exerted less effort when they believed that they were performing within a group. Further manipulations held constant the amount of identifiability such that even when individuals were performing in groups, they were aware that their individual outputs could be measured. This manipulation attenuated the loafing effect. A second study conducted by Williams et al. in which participants were led to believe that their individual efforts were either always identifiable or never identifiable supported and extended the previous findings. When individual outputs were always identifiable, group size had no effect on the amount of noise produced. Furthermore, when individual outputs were not identifiable, group size again had no effect on performance. The amount of noise produced in this condition was, however, significantly less than that in the 'always identifiable' condition. Thus, Williams et al. concluded that identifiability had a significant effect on the amount of effort individuals exerted when performing collectively; that is it moderated the social loafing effect.

Task Valence

Task valence refers to the importance of the task to the individual. Tasks that are perceived as important, meaningful or personally involving by the individual having high levels of task valence. In comparison, tasks that are seen as particularly trivial or irrelevant have low task valence, (Karau & Williams, 1993).

Brickner, Harkins and Ostrom (1986) demonstrated the effect of personal involvement on social loafing effects. Participants were assigned to conditions of high or low identifiability; and high or low involvement, whereby task structure was manipulated such that the task was either high or low in terms of how personally involving it was. When task valence was low, that is the task was not personally involving, participants exerted less effort when outputs were pooled than when they were individually identifiable. This demonstrated a general social loafing effect. However, when the task was personally involving, that is high in task valence, the loafing effect was not present. There was no difference between the outputs of identifiable and non-identifiable participants. These results indicate that loafing was curbed by means of increasing task valence.

Hardy and Latané (1988) however, demonstrated a contrary effect. Using cheerleaders as participants, a social loafing effect was demonstrated for a task involving clapping and cheering. Hardy and Latané argued that for cheerleaders, clapping and cheering were salient, meaningful behaviours thus implying that task valence was high. When performing in dyads, the amount of noise produced by each participant was only 94% of that when performing alone. This finding indicated that social loafing had occurred even when the task was meaningful to the participants. Such an effect was not in concurrence with the findings of Brickner et al. (1986). However Hanrahan and Gallois (1993) argued that the artificiality of the laboratory setting of the study may have attenuated the degree to which the task was perceived as salient. Cheering in a laboratory situation may be somewhat less important, involving or meaningful than cheering at a real sporting event where environmental and situation specific cues may promote task valence.

Despite the contradictory findings reported above, on the basis of their meta-analysis, Karau and Williams (1993) suggested a relationship between task valence and

social loafing. Individual effort on collective tasks is seen to be directly related to task valence in a negative manner. Low task valence tends to lead to individuals engaging in social loafing, while individuals performing tasks high in valence, in general show little or no loafing effect. (Karau & Williams, 1993; Sorentino & Shephard, 1978; Williams & Karau, 1991; Zaccaro, 1984).

Group Valence

Social loafing has been shown to be eliminated when group valence is high (Hardy & Latané, 1988; Harkins & Szymanski, 1988; Karau & Williams, 1993; 1997). High group valence occurs when the group within which the individual is performing has relevance and importance in reference to that individual. For example, group valence is higher when performing with peers, friends, team-mates or respected others than when working with strangers. Central to this concept is that of group cohesion. Groups high in cohesion will tend to perform with higher levels of group valence (Carron, 1988). Furthermore, if the task has particular importance to the group, it provides a standard by which group performance can be compared to or activates some form of salient group identity, group valence is generally high.

Williams (1981, cited in Everett, Smith & Williams, 1992) reported that when secretarial students performed a typing task in which their outputs were pooled with either friends or strangers, productivity was higher when the group consisted of familiar members. Karau and Williams (1997) reported results that lent support to these findings. Employing similar paradigms to that of Williams, they found support for the hypothesis that the degree of social loafing exhibited would be lower for cohesive than non-cohesive groups. Again however, Hardy and Latané (1988) reported conflicting results. They found no significant differences in the amount of social loafing exhibited when cheerleaders were paired with others from their own team, as opposed to when they were paired with members from different teams. However, the artificiality of the laboratory setting could again explain this anomaly, (Hanrahan & Gallois, 1993).

Harkins and Szymanski (1988) found further evidence for group valence influencing social loafing. Instead of operationalising group valence as cohesion, Harkins and Szymanski manipulated the extent to which a standard of comparison was present. This manipulation provided a basis by which the group could be evaluated,

thereby giving more salience to the group output as it afforded a means by which the group could be evaluated in reference to a standard. In this manner, when a standard by which to compare group performance to was present, group valence was higher. The results revealed that the potential for the group product to be evaluated led to an elimination of the loafing effect. That is, the provision of a performance standard led to an increase in the amount of effort exerted during collective performance.

Karau and Williams (1993) reported that their meta-analysis revealed an effect whereby the tendency to loaf was lowest when group valence is high, and increased in relation to decreases in group valence. Combining this effect with the findings of Harkins and Szymanski (1988) regarding the relationship between social loafing and the presence of a group-level comparison standard suggested that social loafing can be overcome by means of increasing group valence.

Expectation of Co-worker Performance

Williams and Karau (1991) reported a series of experiments involving participants generating ideas under either coactive or collective performance conditions. Also manipulated was the perceived ability of co-workers. All the studies conducted found significant support for the notion that individuals will work harder collectively if they believe their co-workers to be low in ability. That is, individuals tend not to engage in social loafing when they perceive their co-workers to be low in ability relative to themselves. The results were consistent in effect regardless of whether the perception of co-worker ability was based on interpersonal trust scores or self-reported intended effort or self-reported ability. In addition, social loafing has been shown to occur when an individual perceives a co-worker to be more able than themselves, (Hardy & Crace, 1991). Kerr (1983) also demonstrated conceptually similar effects, finding that when a coactor was perceived as capable but not contributing to the group, social loafing would occur amongst the other group members.

Jackson and Harkins (1985) reported a somewhat contrary effect. When required to generate noise by shouting participants sought to match the effort they believed their co-workers were exerting. To this extent, it was demonstrated that social loafing was eliminated when co-workers were perceived to be exerting a high amount of effort, as the individual in question would exert more effort in an attempt to match that of their

co-workers. This finding is not consistent with the previously cited research in the area, as high co-worker competence, in this instance, did not have the effect of increasing the incidence of social loafing. Williams and Karau (1991) account for this anomaly by noting that within Jackson and Harkins' (1985) design, the manipulation of co-worker ability was confounded with task valence. Participants were led to believe that co-workers either intended to exert a high amount of effort and felt that the experiment was interesting, or intended to exert little effort and felt the experiment was boring. To this extent, the perception of the value of the task may account for the finding.

Karau and Williams (1993) reported a significant effect for expectation of co-worker performance. Their meta-analysis revealed that individuals tend to loaf more when they expect co-workers to perform well than when they expect co-workers to perform poorly.

Uniqueness of Individual Inputs

The degree to which an individual perceives his or her input to the collective product to be unique has been shown to moderate social loafing, (Karau & Williams, 1993). Harkins and Petty (1982) demonstrated such an effect by assigning participants distinct tasks within a collective performance environment. Participants were required to perform a vigilance task by detecting and reporting signals flashed onto a television screen divided into four quadrants. Half of the participants were instructed to attend to all quadrants when performing collectively. In this manner, any one group member was able to report the presence of the signal. Alternatively, the other half of the participants were assigned a quadrant each to monitor. When responsible for watching only their own quadrant, participants were able to make a unique contribution to the group as no other group member was assigned to their quadrant. The results revealed a reduction in social loafing when individuals were able to make a unique contribution to the group regardless of whether their input into collective performance was identifiable or not. Harkins and Petty also replicated these results using brainstorming instead of vigilance tasks. Kerr (1983), and Kerr and Bruun (1983) have also reported similar results.

Karau & Williams (1993) reported meta-analytic results that confirmed the effect of uniqueness of individual input on the social loafing effect. Loafing was seen to be present when individual inputs to a collective output were perceived as potentially

dispensable or redundant. However, individuals tended not to loaf when they were able to make a unique contribution to the group.

Task Difficulty

Harkins & Petty (1982) demonstrated that task difficulty had significant moderating effects on social loafing. Participants were required to brainstorm and generate as many uses as possible for a particular object. Manipulations were employed such that the object in question afforded few (e.g. a burnt-out lightbulb), or many uses (e.g. a knife), that is, it was relatively difficult or simple to generate ideas. The results revealed that individuals worked as hard collectively as they did individually when working on a difficult task, but less hard collectively than individually when working on a simple task. Thus, it appears that social loafing had been eliminated by means of increasing task difficulty.

Jackson and Williams (1985) replicated and extended these findings. They suggested that collective action reduces the drive to exert effort as evidenced by typical social loafing studies, (e.g. Ingham et al., 1974; Latané et al., 1979). Furthermore, difficult tasks result in poor performance when drive is high (Cottrell, 1972; Zajonc, 1965). Thus working collectively should result in improved performance on difficult tasks as drive is reduced. Participants were required to work on simple or difficult maze tasks alone, coactively or collectively. The results revealed that individual performance was superior to collective performance when simple tasks were performed, while collective activity resulted in higher levels of productivity when the task in question was difficult. Thus working collectively resulting in enhanced performance on difficult tasks; that is, social loafing was eliminated when task difficulty was increased.

This pattern of findings was supported by Karau and Williams' (1993) meta-analysis. They reported significant effects of task difficulty on collective productivity levels, whereby social loafing was not evidenced when the task in question was complex or difficult, but present when simple tasks were engaged in.

Thus, in summary, the body of social loafing literature has revealed that group size, and expectation of co-worker performance are positively related to the degree of social loafing exhibited. On the other hand, evaluation potential, task valence, group valence, uniqueness of individual inputs and task difficulty are all related to social loafing in a

negative manner. These patterns of results have all been confirmed by Karau and Williams' (1993) meta-analysis of social loafing research. In addition a number of studies have repeatedly demonstrated characteristics of the social loafing phenomenon, which while not strictly moderating factors as such, serve to broaden general understanding of the effect. The attributes of subjective estimates of performance, punishment and knowledge of the loafing effect will each be examined in turn.

Additional Characteristics of Social Loafing

Within the domain of social loafing research, when experimental procedures have required participants to provide subjective estimations of their own effort, some interesting results have been revealed. Based on their meta-analysis, Karau and Williams (1993) reported that the empirical literature indicates that individuals tend not to accurately report the amount of effort they exert by overestimating their effort and productivity when performing collectively. Furthermore, participants were willing to acknowledge social loafing effects that other group members had displayed. Thus, it appears that either individuals are not aware that they are engaging in social loafing, or do not wish to portray themselves in a negative manner and hence do not report exerting less effort when performing collectively compared to when performing individually or coactively. Williams, Harkins and Latané (1981), and Jackson and Harkins (1985) have demonstrated such an effect.

Miles and Greenberg (1993) suggested that the threat of punishment for substandard performance would attenuate social loafing. They tested this premise within the domain of competitive swimming. Participants were members of high school swim teams who were provided with performance standards on the basis of pilot testing. This standard was difficult, but not unattainable. Manipulations were made on the basis of performance condition (individual/collective) and the presence or absence of a punishment contingency. Punishment took the form of swimming extra laps in training, which, it was threatened, would be administered if performance did not meet the predetermined standard. Three levels of punishment were threatened: severe, moderate or no punishment on the basis of the number of penalty laps to be completed. The results demonstrated significant social loafing effects when no punishment was threatened. When punishment was threatened, collective performance increased and no

social loafing effect was present. Thus, the perception that substandard collective performance was punishable led to an attenuation in social loafing.

Huddelston, Doody and Ruder (1985) investigated the effect of knowledge of the social loafing phenomenon on individual performance in a collective situation. It was postulated that if individuals were informed as to the nature of social loafing effects, possible causes of such effects and the implications for performance, then they would not engage in loafing behaviours. Participants were required to perform a 55-metre sprint individually and as a member of a relay team. The control group received no information regarding social loafing, while the experimental group was briefed as to the nature of the phenomenon. The results revealed no significant differences between the amount of loafing evident for each condition. Thus, no support was found for the premise that social loafing could be eliminated by means of educating an individual as to the existence of the effect.

THEORETICAL EXPLANATIONS OF SOCIAL LOAFING

With the emergence of a large body of robust empirical research in the domain of social loafing, there was a necessity for the development of theoretical explanations for this group phenomenon. While there have been a number of attempts to explain social loafing, researchers, in the past have often only focused on a single causal mechanism. Although such theories are somewhat limited in generalisability since they characteristically only account for a small number of moderating variables, they do provide valuable explanations for aspects of the social loafing phenomenon.

Social Impact Theory

Latané (1981) proposed that Social Impact Theory provided a theoretical account of the social loafing phenomenon by specifying the effect of the presence of others on the individual. When others are present they act as either sources or targets of social influence. Social influence is seen to act as a force, in the same manner as physical forces such as light and sound, which impacts on the behaviours of the target of the influence. For example, others may distract, arouse, threaten or otherwise affect an individual simply by means of their presence. They are seen to be influencing the individual in question. The amount of influence experienced by the target is seen to

result from the product of the strength and salience of the influence, the closeness in space and time of the influence and the number of sources present.

When the individual is part of a group, the other group members as well as being sources of influence, also act as targets. In this manner, a given amount of influence gets spread across the group members, thus subjecting each individual to a smaller degree of influence, than would be the case if each individual were alone. The impact of the influence is less, as it is divided amongst each member. In this instance, the amount of influence experienced is predicted to follow the inverse power function of strength, immediacy and number of sources present as group size increases. In other words, as group size increases, the amount of impact experienced by each member decreases.

It is this diffusion of social impact across group members that can provide an explanation for social loafing effects. Within a typical social loafing paradigm, the experimenter is a source of social influence, in terms of the instructions he or she delivers to the participants. Generally, participants are required to exert as much effort as possible. When performing individually, there is only one target of this influence and the degree of influence experienced is relatively high. However when performing collectively, the same amount of influence gets spread across all the group members. Therefore, each member experiences less influence relative to the size of the group. If there is less influence experienced, then there is less pressure to perform, resulting in social loafing effects. Latané (1981) modelled this mathematically, noting that in the case of social loafing, "effort seems to decrease in proportion to the sixth root of the number of people working together," (p.353).

Within the context of social loafing research, Social Impact Theory provides an adequate theoretical account of the effect of group size on collective performance. However, beyond this, the theory has little predictive power pertaining to the host of other moderating variables that have been shown to influence social loafing effects. Mullen (1985) suggested that Social Impact Theory does not describe the psychological mechanisms that underlie the processes it describes. Hence, it seems that this shortcoming may also limit the power of Social Impact Theory to describe the loafing phenomenon in general.

Deindividuation

Deiner (1980) described a process of deindividuation whereby group environments that afford anonymity, high arousal levels, a focus on external events and high levels of group valence can lead to a reduction in self-awareness on the part of the individual. A lack of self-awareness can in turn lead to a lowering of self-regulatory ability. Consequently, individuals tend not to monitor their own behaviour, or to be aware of the results of their actions. Consequently, because the product of their behaviour is not apparent to the individual, there is no opportunity to compare themselves to any standards, whether they are personal or social in nature. Without occasion for social comparison, individuals often have a lesser concern in regard to the evaluations of others.

Applied to social loafing, the theory of deindividuation prescribes that, within a collective context, an individual may lose self-awareness and hence evaluation apprehension, (Mullen, 1983). Without concern for evaluation, motivation may decrease thereby resulting in decreased effort and the associated loafing effect. This notion is conceptually similar to that of low identifiability whereby when individual contributions to a collective product are not identifiable, social loafing results, (Williams, Harkins & Latané, 1981).

There is, however, currently no empirical support for the process of deindividuation and reduced self-awareness being a cause of social loafing. Stevenson (1990, cited in Karau & Williams, 1993) conducted the only study to date which directly manipulated the degree to which individuals were self-aware. The results showed no support for this theoretical explanation of the loafing phenomenon.

Equity of Effort

Jackson and Harkins (1985) proposed that identifiability was not the sole determinant of decreased motivation in collective settings. As an alternative, they suggested that individuals matched their efforts with the level they expected co-workers to be exerting. According to Jackson and Harkins, when in collective settings individuals expect co-workers to loaf and therefore reduce their own efforts in order to maintain equity, such that each group member is doing their fair share of the work. Jackson and Harkins demonstrated this effect experimentally, manipulating the degree to which co-workers

were expected to exert effort. The results provided support for the notion that individuals tend to loaf when they expect co-workers to behave in a similar manner.

However, this theory has been criticised on the basis of contrary findings. Hardy and Latané (1988) found that when performing a noise generation task, cheerleaders reported trying significantly harder in pairs than when alone, despite the fact that they had no knowledge of co-worker effort. An 'equity of effort' account would predict that in this situation, co-workers would be expected to loaf and therefore the individual in question would also reduce their efforts. Furthermore, Karau and Williams (1993) dispute the empirical evidence in support of equity of effort theory, noting that Jackson and Harkins' (1985) procedure intended effort was confounded with task valence, thereby providing inconclusive results. As such the validity 'equity of effort' explanations of social loafing has been questioned, however debate has not fully resolved the controversy.

Arousal Reduction

Jackson and Williams (1985) accounted for the moderating effect of difficult tasks on social loafing in terms of drive theory. Zajonc (1965) proposed that high levels of arousal was detrimental to the performance of difficult tasks. Furthermore, by means of extending Latané's (1981) theory of social impact, Jackson and Williams reasoned that the presence of others does not necessarily increase arousal. Under circumstances whereby coactors serve as sources of social influence, arousal and therefore the drive to perform will increase. However, if coactors are also targets of social influence (i.e. in a collective performance setting) arousal will decrease, and with it the associated drive to perform. Since social loafing involves a reduction in drive to exert effort, this reduction and the associated reduction in arousal should be beneficial to the performance of difficult tasks. Jackson and Williams (1985) found empirical support for this line of reasoning by demonstrating that social loafing is eliminated when the task in question is difficult.

Dispensability of Effort

Harkins and Petty (1982) claimed that the arousal reduction that occurs when working collectively on difficult tasks is on its own, not a complete explanation for the

phenomenon. They claimed that the individual evaluated the extent to which his or her contribution to the collective output was required. If they perceived their effort to be redundant, that is unnecessary for high quality group performance, they may subsequently exert less effort. On difficult tasks, it is more likely that contributions from all group members are required, therefore effort will be increased and social loafing attenuated. Kerr (1983), and Kerr and Bruun (1983) have suggested similar theoretical explanations for the social loafing effect.

In summary, a number of theoretical explanations of the social loafing effect have been offered. As a whole, this group of theories is able to account for the majority of findings within the domain of social loafing research. However, individually, each theory has little explanatory power outside the specific situation to which it is designed, as highlighted by the fact that findings contrary to the particular predictions of a given theory are not uncommon. Thus, there appears to be a need for further work in this area, particularly in terms of developing more unified and generalisable theoretical accounts of the social loafing phenomenon.

THE COLLECTIVE EFFORT MODEL

As can be seen from the brief review of theoretical accounts of social loafing presented above, the coverage of this area is somewhat piecemeal in nature. Each theory typically accounts for only one or two of the empirically identified moderators of social loafing. As such, each theory provides valuable insight into the nature of social loafing within specific circumstances, but is limited in terms of its generalisability to the loafing phenomenon under other conditions. Thus, given these limits, it is not possible to make valid predictions regarding social loafing effects outside of the domain specific to a particular theory.

Karau and Williams (1993) attempted to provide a more complete and integrated theoretical account of social loafing when proposing the Collective Effort Model, (CEM). The CEM (see Figure 1), is an adaptation of traditional expectancy-valence models of motivation (e.g. Vroom, 1964) to incorporate collective performance. The CEM suggests that the level of effort an individual will exert on a collective task will be dependant on the extent to which they perceive their efforts will be instrumental in obtaining a valued outcome. In a similar manner to traditional, individual level

expectancy-valence models of motivation, the CEM identifies three factors central to the motivation of individuals performing in coactive conditions: (i), expectancy; (ii), instrumentality; and (iii), valence. These factors specify the relationships the performer perceives between firstly, the degree to which high levels of effort are expected to lead to high levels of performance, that is expectancy.

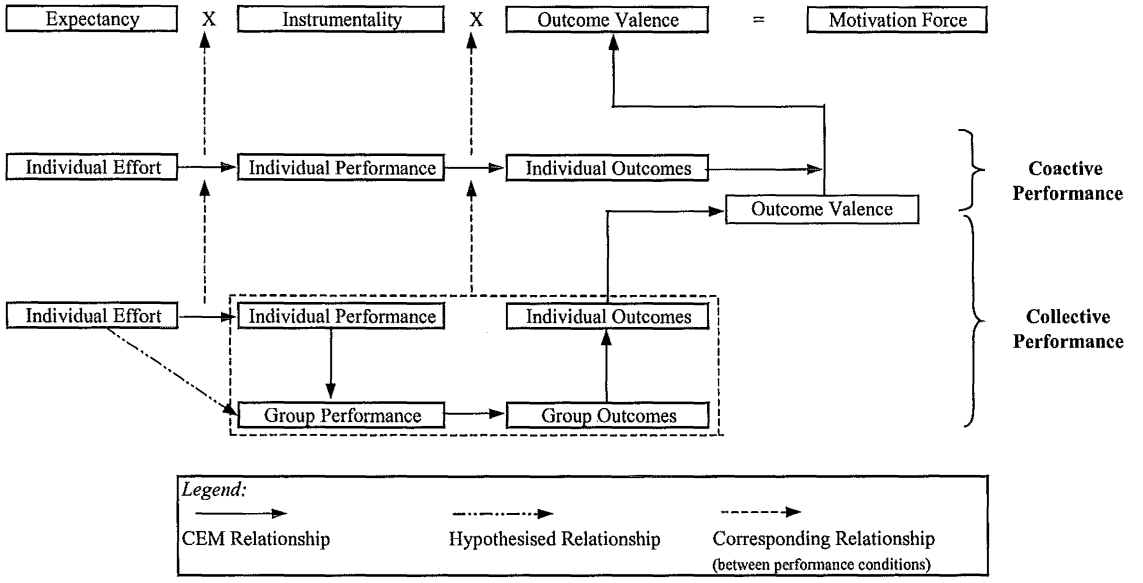

Figure 1. The Collective Effort Model (CEM).
(Adapted from Karau & Williams, 1993)

Generally, a 'rule of thumb' will apply whereby the harder you try, the better you will perform, however this relationship may not always be quite so strong or direct. If, for example, a kayaker is paddling a boat that is holed and taking on water, then there will be disruption between the amount of effort her or she exerts and his or her performance. This is due to the fact that at the same time they are paddling, the boat is also sinking and with these two factors working against each other, performance will be decreased. In this manner, effort is not as strongly related to performance as when there is not influence of faulty equipment.

Secondly, the CEM specifies the instrumentality contingency as - the degree to which high quality performance is perceived as instrumental in obtaining an outcome. This refers to the distinction between performance and the result of the performance, namely the outcome. In the example of competitive sport there are instances where extraordinarily high quality performance on the part of one competitor does not lead to

the desired outcome of winning, generally because of the quality of the opponent. To take this to an extreme, a social jogger is never going to win an Olympic medal in track, as the opposition is simply too strong. In this instance, high quality performance has little or no bearing on obtaining the desired outcome, that is an Olympic medal.

Thirdly, the degree to which the outcome is viewed as desirable defines the CEM contingency of outcome valence. This notion simply refers to the subjective value placed on the outcome by the individual performer. Identical outcomes can be valued differently by different individuals. In combination, the relative perceived strengths of the contingencies of expectancy, instrumentality and outcome valence forms the theoretical construct of motivation force. This value is arrived at by multiplication of the perceived strength of each contingency, and as such is seen to be predictive of performance.

The CEM adapts these contingencies of to fit collective performance conditions by suggesting that the added complexity of collective action introduces extra factors to the equation. Specifically, the CEM expands on the instrumentality contingency by stating three determinant factors that influence performance when collective performance is being considered. For any given individual performing within a group situation, the degree to which they perceive high quality performance as instrumental in obtaining an outcome, is seen to be determined by: (a) the perceived relationship between individual performance and group performance; (b) the perceived relationship between group performance and group outcome; and (c) the perceived relationship between group outcome and individual outcome, (see Table 1).

When compared to the equivalent process for coactive performance, it can be seen that the presence of group members and the interaction this creates necessitates the inclusion of the additional contingencies. By virtue of the presence of others, relating individual performance to individual outcomes requires the consideration of the impact of these other group members. To this end, the CEM provides a context within which coactive and collective performance can be directly compared, thus forming a more complete framework from which social loafing can be re-examined.

Table 1. Collective Effort Model Contingencies (including hypothesised contingencies).

Contingency	Coactive Performance	Collective Performance
Expectancy	The degree to which high levels of effort are expected to lead to high levels of performance.	The degree to which high levels of effort are expected to lead to high levels of performance.
Instrumentality	The degree to which high quality performance is perceived as instrumental in obtaining a valued outcome.	(i) The perceived relationship between individual performance and group performance. (ii) The perceived relationship between group performance and group outcomes. (iii) The perceived relationship between group outcomes and individual outcomes.
Instrumentality (hypothesised relationship)		(iv) The perceived relationship between individual effort and group performance.
Valence	The degree to which the outcome is viewed as desirable.	The degree to which the outcome is viewed as desirable.

The CEM and Social Loafing

The CEM models coactive performance in a relatively simple manner. When performing outside of a collective environment, the individual is seen to exert effort relative to the degree to which this effort is seen as conducive to achieving the desired outcome. Breaking this relationship down further, when a valued outcome is available, and high quality performance is seen to be a means by which of attaining this goal, effort will be exerted relative to the perceived relationship between effort and performance. That is, if it is perceived that working hard will lead to high levels of performance, which in turn leads to a valued goal or outcome, then effort will be exerted. For example, a cyclist competing in a race in which winning is the desired outcome, is predicted to exert effort relative to the degree to which that effort will produce high quality performance, and in turn the quality of performance will lead to obtaining the goal. If either relationship is disrupted, for instance faulty equipment may mean that no matter how much effort is exerted maximum performance is not possible, or the ability of the other competitors means that even the highest quality performance on the part of the individual will not allow him or her to win the race, then the motivation to exert effort is predicted to decrease.

The CEM uses a multiplicative combination of the perceived strength of each relationship to arrive at a hypothetical construct of motivation force. Motivation force is seen to represent the predicted amount of effort an individual will direct towards a given task. At this point it is important to note that the value of the outcome is subjective in terms of the perceptions of the individual. In other words, outcome valence is determined by subjective perception of the performer, rather than any objective standard or measurement by which value or desirability is gauged.

The CEM states that the motivation to exert effort will tend to be less for collective tasks than equivalent coactive tasks, that is individuals will engage in social loafing when performing tasks as part of a group. This will occur due to the contingency between effort and outcome being perceived to be stronger for individual or coactive performance than collective performance. This increase arises because of the added complexity of collective action. In terms of CEM contingencies, collective action introduces factors that may disrupt the relationship between effort and outcome. For instance, in a relay team if the other members are not prepared to exert maximal effort, then no matter how much effort a given individual exerts, the outcome will not reach the standard it would had all members performed optimally. Furthermore, the value of the outcome is often decreased in collective situations as it is frequently divided or shared amongst group members. Similarly, motivation to perform will be low if task outcomes are not valued.

The increased complexity of collective action is accounted for in the CEM by the specification of additional contingencies that models the differences between coactive and collective performance. These contingencies specify the degree to which high quality, individual performance, is seen as instrumental in obtaining a valued outcome. In order for motivation to be high, the individual must perceive that their performance will influence group performance, which will in turn influence group outcomes, which will consequently lead to a favourable outcome for the individual. If one or more of these relationships is seen to be disrupted such that the strength of the relationship is decreased, then the individual will be less willing to exert high levels of effort, as effort will be perceived to be less instrumental in obtaining a valued outcome. As a result, a social loafing effect will be observed.

The CEM provides a more general theoretical account of the existing body of social loafing literature, than previously proposed models and theories. Firstly, the CEM predicts that social loafing will occur in collective performance contexts, a notion that has widespread and robust empirical support, (Karau & Williams, 1993). Furthermore, the CEM provides reasoning that suggests that social loafing will be moderated when the individual perceives a strong contingency between effort and outcome. Each of the significant moderators of social loafing identified by Karau and Williams' meta-analysis can be accommodated in this manner. In short, each moderator is seen to affect the perceived instrumentality of effort in obtaining a valued outcome. If the change in this contingency acts to strengthen the relationship, then social loafing will be diminished. Specifically, decreases in group size, and perceived co-worker ability are predicted to strengthen the degree to which outcome is contingent on effort. Smaller groups mean each member must contribute more, while if co-workers are seen as incompetent, the individual must increase effort to help ensure that the desired outcome is achieved. Additionally, increases in group valence, uniqueness of contribution and task difficulty will also act to strengthen the relationship between effort and outcome. In a cohesive group, group outcomes will be similar in nature to individual outcomes thereby adding to the perceived strength of the contingency. A difficult task or one in which each individual can make a unique contribution will generally require all members to contribute in order to attain the desired outcome. As such, higher levels of individual effort will be seen to be required. Finally, increases in task valence or evaluation potential will tend to increase the value of the outcome to the individual, which will lead to increases in motivation, given that the instrumentality of effort in obtaining that outcome remains constant.

Comparisons between the CEM and other theories of group process and social loafing are generally somewhat redundant, as the CEM is integrative in nature. That is, the CEM incorporates the relevant components of prior theories to provide a more generalisable model. However, the constructs and relationships described by the CEM are similar to Steiner's (1972) notion of process. The CEM details the contingencies that determine the degree of effort an individual will exert on a given task. Conceptually this seems somewhat analogous to the course of action by which the

individual allocates resources to meet task demands, that is process. Furthermore, the decreases in effort resulting from a perceived lack of instrumentality between effort and outcome as described by CEM can be equated to process loss, or more specifically, motivation loss as described by Steiner. Although more detailed than Steiner's model, and as such able to account for empirical findings with more accuracy and specificity, the CEM appears to stipulate the conditions within which motivation loss will occur (i.e. lack of instrumentality between effort and performance), the magnitude of such decreases and the associated effect on performance. As such the CEM could, in part, be viewed as an extension of Steiner's model of group process.

The CEM specifies that the relationship between individual effort and group performance is dualistic in nature. First, there is the perception of the degree to which individual effort leads to individual performance, followed by the degree to which individual performance relates to group performance. It is proposed that having two separate relationships is not the most appropriate means of explanation within collective performance contexts, and as such should be replaced by a single construct. If a given performer is acting within a collective context, will he or she necessarily need to relate individual performance to group performance in order to determine how much effort to exert?[7] Alternatively, it could be hypothesised that a relationship between individual effort and group performance is more appropriate, (see Figure 1). To this extent, the role of the deindividuation of group members as described by Deiner (1980), may provide an appropriate explanatory mechanism for this line of reasoning. If a group member loses self-awareness as a result of performing within a collective context, the perception of the relationship between individual performance and group performance, whether this be conscious or subconscious in nature, is going to be interfered with. This will occur as the individual will have little awareness as to their own performance, and as such can not make an accurate appraisal of how much influence their performance will have on that of the group. Perhaps a more appropriate, or additional relationship between individual effort and group performance could be hypothesised.

[7] This is not to imply that the CEM prescribes social loafing as a conscious or deliberate behaviour. Karau and Williams (1993) note that although the CEM is cognitive in nature, it does not prescribe a conscious decision-making process, as it is unlikely that all the relevant task and situational cues will be processed. As such, the CEM suggests individuals may respond to a pre-existing effort script as well as considering the salient characteristics of the task when allocating effort.

As it stands the CEM has not been investigated empirically. Although Karau and Williams (1993) found support for the model using meta-analytical techniques that provide high levels of statistical power, the CEM still requires independent, empirical investigation. Such investigation should provide the basis for further validation of the model, and in particular of the individual contingencies and relationships that are thought to be predictive of behaviour within collective contexts.

SUMMARY OF THE SOCIAL LOAFING LITERATURE

It has been established that social loafing is a valid and robust group phenomenon. Karau and Williams (1993) reported meta-analytical results that confirmed the existence of social loafing as an effect of collective performance, as well as identified relevant moderating variables that influence the degree to which individuals exert effort when performing within a group context. Traditional theoretical accounts of the loafing phenomenon have tended to provide situation specific explanations thereby being limited in generalisability. In order to address this short-coming Karau and Williams postulated the CEM, which integrated key components of existing theories by expanding upon traditional expectancy-valence frameworks of motivation to include collective performance contexts. At present the CEM has not been subject to rigorous empirical investigation, however has been supported by meta-analytic procedures.

THE PRESENT RESEARCH

The present research will examine social loafing and the applicability of the CEM as an explanatory mechanism of this group phenomenon. This investigation will take the form of one piece of empirical research, testing the individual contingencies of the CEM. In this manner, if support is found for the predictions made by the CEM, a degree of validity can be added to the model.

The current research will examine social loafing, and the CEM, as they apply to an athletic domain, notably team sports. The rationale for conducting empirical research within the context of sports teams, centres around the concept that social loafing is potentially damaging to the productivity of the group. If the general concept of social loafing, and its relationship to the functioning of social groups is applied to a specific

collective performance setting, namely a sports team, its significance becomes immediately apparent. Effective functioning of any sports team almost certainly requires, to some degree, the collective functioning of the athletes who constitute the team. If group activity results in sub-optimal individual performance, as is the case when social loafing occurs, then it follows that group performance will fall below what is potentially possible. Given that the motives of sports teams in general are oriented towards competition and winning, sub-standard group performance will threaten the achievement of these goals.

Intuitively, one may suggest that social loafing will not necessarily occur in sports teams. The common notion that teams are characteristically high in cohesion, share group goals, have a sense of 'team spirit' and the like, suggests that loafing effects may not be present in this domain, (Carron, 1988). However, social loafing has been demonstrated to be harmful to productivity levels of sports teams. For example, Williams, Nida, Baca and Latané (1989) found that members of collegiate swimming teams loafed when swimming in a relay in which there was low identifiability as individual split times were not announced. Hardy and Crace (1991) demonstrated a similar sub-optimal collective performance effect amongst rowers. Numerous other studies have found consistent effects in team sports, most notably Huddleston, Doody and Ruder (1985) with athletic relay teams; Everett, Smith and Williams (1992), and Miles and Greenberg, (1993), both with swimmers; and Anshel (1995) with rowers. This body of literature has also investigated a number of factors mediating the loafing process within the applied setting of team sports, and revealed effects consistent in size and direction to those identified by Karau and Williams (1993) in their meta-analysis of social loafing. Thus, it can be concluded that social loafing effects do occur within team sports, and as such can be potentially damaging to performance.

The present research will attempt to examine the relationships specified the CEM contingencies of expectancy (the perceived relationship between individual effort and individual performance), instrumentality (the degree to which individual effort is perceived to be instrumental in obtaining a valued outcome) and valence (the degree to which the outcome is viewed as desriable), as they apply to the collective performance of sports teams. In addition to relating the perceived stregnth of each contingency to

individual effort within a collective context, the product of the three relationships, that is motivation force will be examined in relation to social loafing. In this manner a framework will be provided from which the validity of the CEM as an explanatory mechanism of social loafing in an applied setting can be tested.

CHAPTER III
THE CURRENT EMPIRICAL INVESTIGATION

The review of the social loafing literature presented in chapter 2 revealed some limitations within this body of research. Primarily, the CEM, at current has no empirical support beyond that supplied by Karau and Williams' (1993) meta-analysis of the social loafing literature. Furthermore, research regarding the social loafing phenomenon as it applies to the domain of team sports is scarce, and although typically consistent with social loafing research in general, needs further investigation. Thus, the purposes of the present investigation are twofold: (i) to establish conditions under which social loafing is attenuated in a sporting domain; (ii) to test the perceived contingencies of collective action as specified by the CEM in terms of their ability to predict social loafing.

The present study attempted to create a framework for testing the CEM contingencies by means of manipulating performance conditions that have previously been shown to moderate social loafing (Karau & Williams, 1993). This was operationalised by means of varying the degree of perceived identifiability and task valence inherent to the performance conditions employed; hence creating a design that allowed for between condition variances in social loafing to be observed in conjunction with variances in CEM contingencies. It is important that the magnitude to which social loafing was exhibited have some degree of variability between conditions in order to allow these contrasts to be reflected in the CEM contingencies. If the degree to which social loafing was exhibited was stable across conditions, the ability to test the CEM, as a predictive model of social loafing would be limited due to this lack of variance in loafing. For example, if a high degree of loafing was exhibited across all conditions, this may well be reflected by perceptions of strong relationships between the CEM contingencies, however few conclusions can be drawn from this situation as there is no contrasting effect with which to compare. That is, in order for the CEM to be able to predict changes in loafing, there must be some changes present. To this extent, the independent variables employed in the present research were chosen because they have consistently shown large and reliable effects on the phenomenon of social loafing.

The CEM predicts that social loafing will be attenuated when the perceived

relationship between individual effort and outcome is strong, that is when the individual perceives the amount of effort he or she exerts will influence the outcome of the task for him or her. The CEM specifies that the added complexity of collective performance requires contingencies additional to that of coactive performance in order to accurately model the relationship between effort and outcome. These additional contingencies relate individual performance to group performance, group performance to group outcomes, and group outcomes to individual outcomes. In this manner, these three contingencies in sum make up the instrumentality contingency for collective performance, which is equivalent to the single instrumentality relationship between individual performance and individual outcomes for coactive performance. Variables that are predicted to moderate social loafing are also predicted to strengthen the perceived relationship between one of more of the instrumentality contingencies for collective performance. This occurs because an increase in the perceived strength of the instrumentality contingency will result in an increase in the CEM construct of motivation force. Motivation force is the product of the perceived strength between all the CEM contingencies, and as such represents, the amount of motivation to perform that any given performer is predicted to have. As such motivation, force for collective performance is predicted to be negatively related the degree of social loafing exhibited. Although the contingencies of expectancy and outcome valence also contribute to predicting motivation force and thus performance, there is no difference between the nature of these relationships for coactive and collective performance. As such it is the instrumentality contingency, or more precisely the product of the three components of the instrumentality contingency, that will reflect changes in motivation force, and consequently in social loafing if in fact the CEM is a valid model of collective performance. That is, a negative relationship between both the individual sub-components of instrumentality and the overall instrumentality contingency, and the degree of social loafing exhibited was predicted.

A contingency between individual effort and group performance was hypothesised on the basis that collective performance may tend to lead to the deindividuation of individual group members, (Deiner, 1980). As a consequence of deindividuation, individuals tend to lose self awareness, and this may lead to difficulties evaluating their

own performance levels. As such if the quality of their own performance is not apparent to the performer, no relationship between individual performance and group performance can be assessed, as no information is apparent regarding individual performance. However, it was hypothesised that a relationship between individual effort and group performance may serve to redress this problem, by avoiding any relationship between contingencies which involves an assessment of individual performance when performing collectively. Furthermore, clearer trends may be revealed within the hypothesised relationship between individual effort and group performance, which may not be found within the instrumentality contingency as it stands due to the problems discussed. As such, it was predicted that relationship hypothesised between individual effort and group performance should be perceived as stronger when task valence or identifiability are high.

Identifiability of individual performance was employed as a potential moderator of social loafing for reasons of robustness and effect size. The potential for individual performance to be evaluated has been consistently demonstrated to attenuate social loafing, (Hardy & Latané, 1986; Harkins & Jackson, 1985; Kerr & Bruun, 1981; Waller, 1996; Williams, Harkins & Latané, 1981). Furthermore, Karau and Williams (1993) reported, that as a moderator of social loafing, identifiability resulted in a larger effect size between coactive and collective performance than any of the other variables reviewed. That is, the absence of identifiabilty during collective performance resulted in more social loafing than the relevant manipulation of any one of the other moderator variables. To this extent, it was proposed that by manipulating identifiability, there would be a large degree of between condition variance in terms of the amount of social loafing exhibited. This in turn would be reflected in similar patterns of variance in terms of perceived instrumentality if the CEM is in fact an accurate predictor of social loafing.

In terms of the CEM contingencies pertaining to collective performance, task valence is predicted to influence two of the three instrumentality relationships. Firstly, with all other factors held constant, a high level of task valence is predicted to strengthen the perceived relationship between group performance and group outcomes. If a valued extrinsic reward is attainable on the basis of high quality group performance,

then this outcome (i.e. obtaining the reward) is seen to be contingent on the group performing well. Secondly, given that the reward offered is not only valued by the group, but by the individual as well, it follows that individual outcome will be dependent on the group outcome. To this extent, by manipulating task valence such that when it is high, the groups are offered a cash reward for high quality performance, and that this reward when divided amongst group members is sufficiently rewarding to the individual, it is predicted that the perception of the strength of the instrumentality contingency will be positively related to task valence. Furthermore, an interaction between task valence and identifiability is predicted such that instrumentality will be highest when both variables are high. From this prediction it also follows that social loafing will be lowest when both identifiability and task valence are high.

Previous literature has identified group valence as a moderating variable of social loafing (Hardy & Latané, 1988; Harkins & Szymanski, 1989; Karau & Williams, 1993; 1997). As cohesion is an aspect of group valence (Carron, 1988), it follows that cohesion should be negatively related to social loafing. Group cohesion was measured in an attempt to identify a relationship between this construct and social loafing. The majority of previous research on group valence has manipulated cohesion experimentally rather than measuring it. By establishing a relationship between cohesion and social loafing correlationally, as opposed to manipulating cohesion experimentally, there is less chance of any result that emerges being an artefact of the experimental procedure. Some level of cohesion was inherent within each group of participants employed in the study as these groups were formed on the basis that each member came from the same existing sports team. Given that cohesion is present to some degree within any intact group, it follows that the groups used in the study were cohesive to some extent (Carron, 1988). For the duration of the involvement of participants in the procedure, cohesion should remain a constant construct, and should not change as a result of any experimental manipulation, and so a true representation of the relationship between cohesion and social loafing will be obtained by means of correlational methods.

Additionally, ratings of self-efficacy and group-efficacy were taken. By comparing these two ratings, it was possible to derive a further rating of perceived co-worker

ability relative to that of each participant. Karau and Williams (1993) reported that individuals tend to loaf more when they expect co-workers to perform well than when they expect co-workers to perform poorly. Accordingly, it was predicted that the perception of co-worker ability would be positively related to the degree of social loafing exhibited. The final contingencies measured were those of self-reported effort and performance. The subjective estimation of effort in social loafing situations has been shown to be somewhat inaccurate; individuals tend not to report decreased effort in collective performance when social loafing has in fact been displayed (Karau & Williams, 1993). Thus, it was predicted that there will be no differences between subjective estimations of effort and performance for individual performance and collective performance, and consequently no relationship between ratings of effort and degree of social loafing exhibited.

On the basis of the preceding reasoning, the following hypotheses were derived:

1. That when identifiability and task valence are low, social loafing will be exhibited, however this effect will be attenuated when either identifiabilty or task valence are high, and the degree of attenuation will be greatest when both variables are high.
2. That when identifiability and task valence are low, the CEM contingency of instrumentality will be perceived to be weaker than when either variable is high, which in turn will be perceived as weaker than when both variables are high.

METHOD

Participants

The sample used in this study consisted of 100 male volunteers recruited from local sports teams. In order to maintain true-groups, participants were recruited in groups of five from existing rugby (11 groups), cricket (2 groups) and touch (7 groups) teams. These teams were all active within organised competitions and covered a range of competitive levels from social grade cricket players to top grade club rugby players. The sample was drawn from both clubs and schools and ranged in age from 16 to 42 years with a mean age of 24 years.

Design

The study employed a 2 (identifiability: low/high) x 2 (task valence: low/high) factorial design. Each intact group was randomly assigned to one of the four experimental conditions.

Materials

Group Environment Questionnaire (GEQ). The GEQ (see Appendix A) is an 18-item questionnaire developed by Carron, Widmeyer and Brawley (1985) to measure cohesion in sports teams. The questionnaire is based on four conceptual sub-scales of cohesion: Group Integration – Task (GI-T); Group Integration – Social (GI-S); Individual Attractions to Group – Task (AGT-T); and Individual Attractions to Group – Social (AGT-S). These sub-scales contained 5, 4, 4 and 5 items respectively, which were presented in the same randomised order to each participant. Participants were asked to rate the degree to which they agreed with a series of statements, each relating to one of the four components of cohesion, on a 9-point Likert scale ranging from 'strongly disagree' to 'strongly agree'. Carron et al. (1985) have demonstrated the GEQ to be both reliable and valid with the GI-T, GI-S, AGT-T and AGT-S sub-scales producing Cronbach alpha reliability coefficients of .70, .76, .75, and .64 respectively (n=247). Content validity assessments were conducted during the test construction process and expert agreement ratings exceeded the experimental protocol of 80%. Construct validity was established by means of factor analysis of subject responses (n=212), (Ostrow, 1990).

Collective Effort Model Scale (CEMS). The CEMS (see Appendix B) is a 22-item questionnaire specifically designed to test the relationships proposed in the Collective Effort Model (CEM), (Karau and Williams, 1993). These relationships are proposed to be predictive of individual performance in both individual and collective situations. As such the CEMS is divided into four subsections which were administered at different stages throughout the procedure.

The first section, 'Individual Assessment – Pre-task' consisted of 4 items and was administered to each participant prior to them completing the individual performance task. The first item was a measure of task related self-efficacy, while the remaining three items (Qs 2, 3, & 4) were measures of three CEM contingencies: expectancy (relationship between individual effort and individual performance), instrumentality (the relationship between individual performance and individual outcomes) and outcome valence (the degree to which the outcome is viewed as desirable) respectively.

Following individual task performance, the second section of the questionnaire, 'Individual Assessment – Post-task', was administered. This consisted of three items, two acted as subjective measures of effort (Qs 1 & 2) and the third formed the first part of the manipulation check of the identifiability variable. For this item, participants were asked to rate to what extent they felt their individual performance was being monitored. This measurement was taken in order to establish a baseline against which to make both within group comparisons (i.e. individual vs. collective performance), to ensure extraneous variables were not influencing perceptions of evaluation; and between group comparisons (i.e. low vs. high ID conditions), to ensure the ID manipulation was in fact producing differing perceptions of evaluation between the experimental groups.

The third part of the questionnaire, 'Group Assessment–Pre-task' was administered prior to performance of the collective task and consisted of nine items. Six items (Qs 2, 4, 5, 6, 7 & 8) were measures of the CEM contingencies for collective performance: expectancy (relationship between individual effort and individual performance), (Q 2); instrumentality (relationships between: individual performance and group performance, group performance and group outcomes, group outcomes and individual outcomes), (Qs 4, 5 & 6 respectively); and outcome valence (degree to which the outcome is viewed as desirable to: the individual, the group), (Qs 7 & 8 respectively). The seventh item (Q 3)

provided a measure of a hypothesised relationship between individual effort and group performance, not predicted by the CEM. The remaining two items (Qs 1 & 9) were measures of self and collective efficacy.

The final section of six questionnaire items, 'Group Assessment – Post-task', was administered following completion of the collective task. Three items were subjective measures of performance, two individually based (Qs 1 & 2) and one group based (Q. 3). Two items (Qs 4 & 5) formed the second part of manipulation check of the identifiability variable, requiring participants to estimate the extent to which they felt both their own and the group performance had been evaluated. The first item provided a comparison for the baseline measurement which was established after individual performance but prior to any experimental manipulation, while the second item was an assessment of any perceived differences between group and individual level evaluation for the collective condition. The final item (Q. 6) served to assess how relevant participants felt the skills involved in performing the running task were to performance in their own sport. All questionnaire items utilised a seven point Likert response format anchored at 'no influence / not important' and 'total influence / extremely important'.

Apparatus

The running course was marked out using 20 centimetre high, brightly coloured cones. The course measured 22 metres in length and was comprised of ten cones spaced 2 metres apart which was preceded by a 4 x 2 metre lane bordered by four cones. The first two and last cone were larger and of a different colour than the others signifying start and finish point and turn-around point to the participants. Participants were timed by two independent timers using hand held digital stop-watches accurate to one one-hundredth of a second. Mean times were recorded for each subject.

Procedure

Participants were invited to take part in the study and informed that the aim of the project was to "investigate the nature of the group dynamics that take place when individuals interact in a team environment". They were informed that their involvement required the performance of individual and group based relay tasks, and the completion of the associated questionnaires.

The participants were required to run backwards around a series of marker cones alternating to the left and right side of each cone such that they were performing a weaving type motion, starting and finishing at the same point. Although participants believed their performance was being timed for the duration of the task, they were only actually timed for the middle section of the course, beginning and ending when the performer passed through the second set of cones. This allowed for any co-ordination losses that may have occurred during the transition and acceleration phases of the task to be eliminated. Each participant took part in two trials, firstly alone in the individual performance condition in which each participant performed separately and this performance formed the basis for evaluation; and secondly as part of a relay consisting of all 5 group members in the collective performance condition. In this condition each participant again performed separately, however aside from the first group member, each group member was not permitted to begin performing until the previous member had crossed the finishing point. Participants were told that for this condition performance was based on overall group time.

Identifiability Manipulation. The identifiability (ID) variable was manipulated to either a low or high level for the collective performance condition. Participants in the low ID condition were informed they would not be timed individually during the relay task and the only assessment of performance would be an overall group time with no individual split times being taken. In reality, split times were recorded surreptitiously so as to gain a measure of individual performance without influencing motivation levels. In the high ID condition, participants were informed that both individual split times and group time would be taken and recorded.

Valence Manipulation. The task valence (VAL) variable was also manipulated to either a low or high level for the collective performance condition. Participants in the high VAL condition were required to perform the relay task twice, however prior to the second performance they were informed that they were competing against the other teams in the study for a cash incentive. The winner would be the team that recorded the greatest improvement in time between the first and second collective trials. In this manner, teams of varying athletic ability were able to feasibly compete against each

other without any one team having an advantage. This design presented participants in the high VAL conditions with an extrinsic incentive to perform well during the second relay trial. In the low VAL condition, participants were not informed of any incentives, and only took part in one collective trial.

Participants were thanked for their participation and verbally debriefed at the conclusion of the procedure as to the nature of the experimental manipulations performed.

CHAPTER IV
RESULTS

The mean scores of all measurements as a function of experimental condition are presented in Table 2.

Manipulation Checks

Participants in the low ID conditions rated their performance as being evaluated to a lesser degree than those in high ID conditions, $t(98)=5.61$, $p<0.001$, ($M_{\text{low ID}}= 4.36$, $M_{\text{high ID}}=5.76$). The low ID groups also perceived the group performance to have been evaluated to a greater extent than their personal performance in the collective performance condition, $t(98)=-7.92$, $p<0.001$, ($M_{\text{individ.}}= 4.36$, $M_{\text{group}}=6.14$). Furthermore, in line with the predictions there were no significant differences found between perceived levels of evaluation for the high ID groups when comparing firstly individual and collective performance and secondly individual and group level evaluation for the collective condition.

The CEMS questionnaire item representing the CEM contingency of outcome valence at the group level (Group Assessment - Pre Task: Q8) served as a manipulation check for the VAL variable. Participants in the low VAL conditions reported placing less importance on high quality group performance than those in high VAL conditions $t(98)=2.70$, $p<0.01$, ($M_{\text{low VAL}}= 4.98$, $M_{\text{high VAL}}=5.64$), indicating the manipulation had the desired effect.

Task Performance

Objective Measures of Performance. In order to objectively analyse the performance of the physical task an index of social loafing was created. This was determined by first calculating a difference score between individual and collective performance by means of subtracting each participant's own individual split time from collective performance[8], from their individual performance time. This figure was then divided by their individual time to produce a score representative of the proportion of performance loss present when collective performance was compared to individual performance; namely

[8]For participants in high VAL conditions (i.e. B and C) collective performance time was taken as the *second* collective trial, that is after the introduction of the VAL manipulation.

the degree of social loafing exhibited. This can be expressed as:

$$S\,L = (Time_{(Individual\ Performance)} - Time_{(Collective\ Performance)}) / Time_{(Individual\ Performance)}$$

Table 2: Mean Values for Dependant Measures by Condition.

Questionnaire Item	CEM Contingency	Other Contingency	A (lo ID, lo VAL)	B (hi ID, hi VAL)	C (lo ID, hi VAL)	D (hi ID, lo VAL)
Ind.:Pre-task						
1	-	Self Efficacy	4.48	4.68	4.84	4.60
2	Expectancy	-	5.60	5.78	5.72	5.88
3	Instrumentality	-	5.64	5.12	5.56	5.60
4	Outcome Valence	-	5.16	5.28	4.76	4.96
		Motivation Force	163.64	156.24	154.04	165.32
Ind.:Post-task						
1	-	Effort (subjective)**	$^{y}0.75$	$^{y}0.71$	$^{y}0.74$	$^{y}0.79$
2	-	Ind. Perform (subj.)***	4.68	$^{y}4.36$	4.68	$^{y}4.29$
3	-	ID manip. Check 1	5.68	5.72	6.08	5.58
Gp: Pre-task						
1	-	Self Efficacy	5.00	5.20	5.00	4.96
2	Expectancy	-	5.60	5.68	5.76	5.84
3	-	Ind. Eff. > Gp. Perf.	5.12_a	5.28_a	4.28_b	5.64_a
4	Instrumentality (i)	-	5.04_{ab}	5.16_a	4.36_b	5.52_a
5	Instrumentality (ii)	-	5.48	5.48	5.68	6.16
6	Instrumentality (iii)	-	4.96	5.00	5.28	5.20
	Instrumentality	-	5.16	5.21	5.11	5.63
7	Outcome Valence (i)	-	5.04	5.48	4.84	5.56
8	Outcome Valence (ii)	-	4.76_a	5.52_{ab}	5.76_b	5.20_{ab}
	Outcome Valence	-	4.90	5.50	5.30	5.38
9	-	Group Efficacy	5.08_a	5.80_b	5.60_{ab}	5.20_{ab}
	-	Co-worker Ability	-0.08	-0.60	-0.60	-0.24
	-	Motivation Force	143.77	166.93	157.75	180.05
Gp: Post-task						
1	-	Effort (subjective)**	$^{z}0.81$	$^{z}0.86$	$^{z}0.80$	$^{z}0.84$
2	-	Ind. Perform (subj.)***	4.84_a	$^{z}5.76_b$	4.96_a	$^{z}5.00_a$
3	-	Gp Perform (subj.)	5.12_a	5.88_b	5.56_{ab}	5.04_a
4	-	ID manip. Check 2	4.64_a	5.96_b	4.08_a	5.56_{ab}
5	-	ID manip. Check 3	6.00	5.80	6.28	5.88
6	-	Relevance	4.48_a	4.84_a	2.96_b	4.68_a
GEQ	-	ATG-S	35.88	32.44	36.12	33.40
GEQ	-	ATG-T	26.76	26.68	28.28	28.28
GEQ	-	GI-S	25.68	23.16	26.48	22.84
GEQ	-	GI-T	28.56_a	30.52_{ab}	33.8_b	30.28_{ab}
-	-	Time: Individual (secs)*	$^{y}15.65$	$^{y}17.04$	$^{y}16.31$	$^{y}17.02$
-	-	Time: Collective (secs)*	$^{z}16.90_a$	$^{z}15.32_b$	$^{z}15.49_b$	$^{z}16.46_{ab}$
-	-	Degree of Loafing	0.08_a	-0.10_b	-0.05_c	-0.03_c

Note: (1) for each row means with different subscripts differ significantly from each other, (Tukey, $p<0.05$). (2) for contingencies marked with the same symbol (e.g. *, **, etc.), within each column means with different superscripts differ significantly from each other, (Tukey, $p<0.05$).

As such each participant's performance was able to be compared to the other participants, creating an index of social loafing. This index had a mean value of 0.02, a standard deviation of 0.062 and ranged from -0.124 to 0.166. Of note here is that a negative index value is representative of a faster time in the collective performance condition than the individual condition, indicating a gain in productivity for group performance. Furthermore, there were no significant relationships revealed between scores on the loafing index and the CEM construct of motivation force.

In order to determine the effect of the experimental manipulations on task performance, each participant's individual loafing score was grouped by condition. Comparisons between each condition were made by means of a 2 (ID: low/high) x 2 (VAL: low/high) ANOVA which revealed a main effect for ID, $F(1,96)=68.89$, $p<0.0001$. Social loafing was exhibited to a greater degree when ID was low (M = 0.018) than when ID was high (M -0.073). The analysis also produced a similar main effect for VAL, $F(1,96)=9.98$, $p<0.01$. When VAL was low (M = 0.025) the degree of social loafing measured was higher than when VAL was high (M = -0.066). Also revealed was an interaction effect between ID and VAL, $F(1,96)=22.07$, $p<0.0001$, as shown in Figure 2.

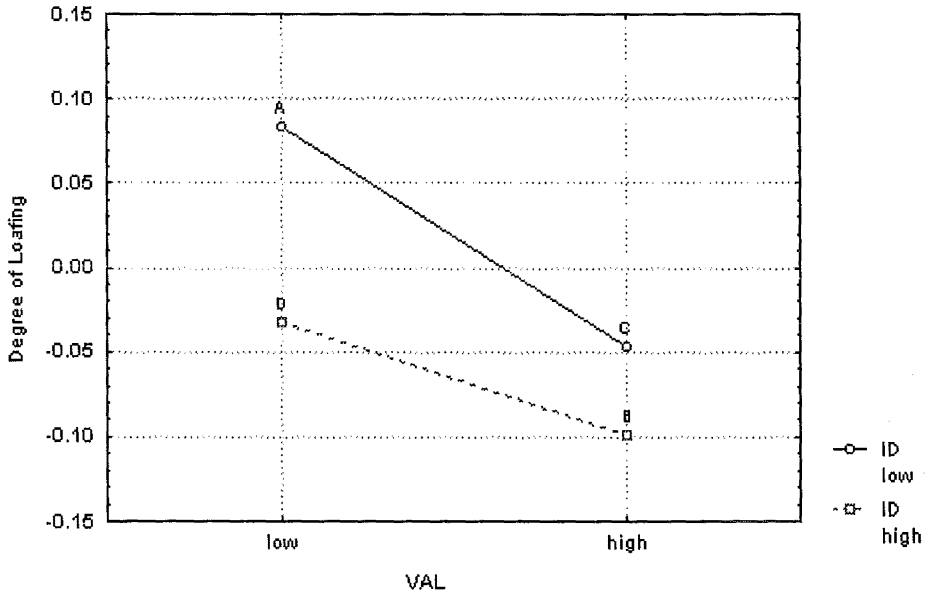

Figure 2: Graph depicting ID x VAL interaction for the mean degree of loafing exhibited by each condition.

Post hoc analysis (Tukey, $p<0.05$) revealed that condition A (low ID, low VAL) exhibited a significantly higher degree of social loafing than the other three conditions, as shown in Figure 3, (see Table 2 for mean values). Furthermore conditions C (low ID, high VAL) and D (high ID, low VAL), while not differing significantly from each other, were shown to experience significantly more productivity loss than condition B (high ID, high VAL).

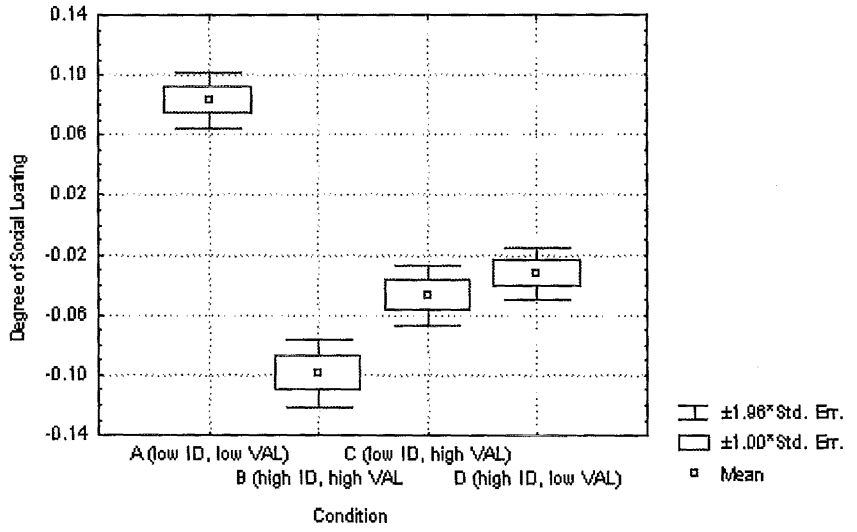

Figure 3: Box plot depicting the degree of social loafing exhibited.

Examining the magnitude of productivity loss for each condition separately revealed that it was only in fact in condition A (low ID, low VAL) that the mean time for individual performance was significantly faster than the mean time for collective performance, $t(24)=8.58$, $p<0.001$; that is, social loafing occurred. The remaining conditions: B (high ID, high VAL), C (low ID, high VAL) and D (high ID, low VAL) all exhibited mean times for individual performance that were significantly slower than that for collective performance; $t(24)=8.03$, $p<0.001$; $t(24)=4.39$, $p<0.001$; and $t(24)=3.69$, $p<0.005$ respectively (see Table 1 for mean values). This indicated that these three conditions experienced gains in productivity from individual to collective performance.

Overall it can be seen that social loafing, or more correctly the degree of productivity loss from which loafing arises, is moderated by the manipulation of either of the independent variables employed. When ID and VAL were both low (condition

A), social loafing was exhibited. However once either variable was manipulated (conditions C & D), loafing was overcome, and productivity gains were experienced. When ID and VAL were both high (condition B), productivity gains were the greatest.

Subjective Estimations of Effort and Performance. As an additional measure of task performance participants were asked to estimate their effort and rate both their own performance and that of the group as part of the two 'post-task' questionnaires (see Appendix B).

In order to determine the effect of manipulation of the independent variables and performance condition on participant's subjective estimations of effort a 2 (ID: low/high) x 2 (VAL low/high) x 2 (Performance Condition: individual/collective) ANOVA with repeated measures on the third factor was conducted. The analysis yielded a significant main effect for Performance Condition, $F(1,94)=94.94$, $p<0.0001$. In addition, a significant ID x Performance Condition interaction was found, $F(1,94)=6.027$, $p<0.05$. Post hoc analysis (Tukey, $p<0.05$) revealed no differences between low and high ID groups' estimations of effort for the individual performance condition. However each group reported exerting significantly more effort for the collective than the individual performance condition, (low ID: $M_{individual}=0.74$, $M_{collective}=0.80$; high ID: $M_{individual}=0.75$, $M_{collective}=0.85$). Furthermore, there was also a difference between low and high ID groups' estimations of effort for the collective performance condition.

A second significant two way interaction of VAL x Performance Condition was also revealed, $F(1,94)=9.178$, $p<0.005$. Post hoc analysis (Tukey, $p<0.05$) showed that while there was a significant difference between low ($M=0.76$) and high ($M=0.73$) VAL groups' estimations of effort for the individual task, this was not present for the collective task. Furthermore, both low and high VAL groups reported exerting significantly more effort for collective performance than for individual performance, (low VAL: $M_{individual}=0.76$, $M_{collective}=0.82$; high VAL: $M_{individual}=0.73$, $M_{collective}=0.83$).

A significant ID x VAL x Performance Condition interaction was also found, $F(1,94)=7.897$, $p<0.01$. Post hoc analysis (Tukey, $p<0.05$) qualified the previous effects, showing in addition that for the collective performance condition, participants in the low ID, high VAL condition (i.e. condition C) reported exerting less effort than

those in the high ID, high VAL condition (i.e. condition B), (M_C=0.79, M_B=0.86).

A second subjective measure of performance involved participants rating the quality of their performance for both individual and collective tasks. A 2 (ID: low/high) x 2 (VAL: low/high) x 2 (Performance Condition: individual/collective) ANOVA with repeated measures on the third factor was conducted using the dependant variable of subjective rating of task performance. A significant main effect for Performance Condition was revealed, $F(1,95)=36.87$, $p<0.0001$. Participants rated their performance as being of a significantly lower quality for the individual task (M=4.50) than the collective task (M=5.15). In addition a significant interaction effect between ID and Performance Condition was found, $F(1,95)=16.07$, $p<0.001$. For the collective performance condition, individuals in low ID groups reported their performance as being of a lower quality than those in high ID groups (Ms=4.90 vs 5.40 respectively). Furthermore, participants in high ID groups rated their individual performance as significantly lower in quality than did participants in low ID groups performing the collective task, (Ms = 4.33 vs 4.90 respectively). No other significant effects were found.

The final subjective measure of performance required participants to rate the quality of the group's performance of the collective task. A 2 (ID: low/high) x 2 (VAL: low/high) ANOVA was conducted, revealing a significant main effect for VAL, $F(1,96)=15.75$, $p<0.001$. Participants rated group performance to be of a higher quality when VAL was high when compared to when VAL was low, (M's =5.08 & 5.72 respectively). No other significant effects were found.

Overall, a comparison between subjective and objective measures of performance revealed a general consistency in effect between the two dependant measurements when social loafing is not exhibited, however when loafing was observed, subjective estimates of performance were inconsistent with the equivalent objective measurements. Participants' estimations of effort did not reflect the actual decreases observed when social loafing was present.

CEM Contingencies

As a measure of the accuracy of the CEM as a predictor of social loafing, participants were asked to rate the extent to which each contingency was applicable to their performance. As can be seen in Table one, analysis of the relationships between the CEM contingencies for collective performance revealed a mixed pattern of results.

Expectancy. A 2 (ID: low/high) x 2 (VAL: low/high) ANOVA revealed no significant effects for the expectancy contingency.

Instrumentality. The instrumentality contingency was split into three factors as specified by the CEM. A 2 (ID: low/high) x 2 (VAL: low/high) ANOVA performed on the first instrumentality relationship (i.e. the relationship between individual performance and group performance) revealed a significant main effect for ID, $F(1,96)=11.94$, $p<0.001$. Participants felt their own performance had more influence on the group's performance when ID was high ($M=5.43$) than when ID was low ($M=4.70$). A significant main effect was also found for VAL, $F(1,96)=7.88$, $p<0.01$, however this effect was opposite in direction to that for ID. Participants felt their own performance had less influence on the group's performance when VAL was high ($M=4.76$) than when VAL was low ($M=4.28$). There were no significant interactions present.

A 2 (ID: low/high) x 2 (VAL: low/high) ANOVA performed on the second instrumentality relationship (i.e. the relationship between group performance and group outcome) revealed a significant interaction effect, $F(1,96)=5.09$, $p<0.05$. However, post hoc analysis revealed no significant simple main effects (Tukey, $p>0.05$). Examination of the interaction (see Figure 4), shows a trend whereby participants in high ID conditions perceived the relationship between the quality of group performance and the outcome for the group to be stronger when VAL was low ($M=6.16$) than when VAL was high ($M=5.48$). This difference between means in fact approaches statistical significance, (Tukey, $p=0.07$).

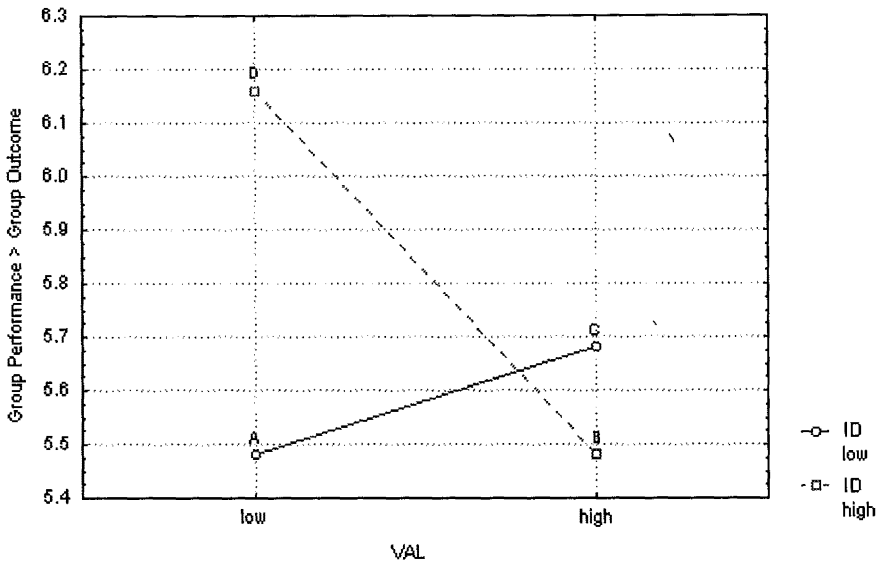

Figure 4: Graph depicting ID x VAL interaction for the perceived relationship between Group Performance and Group Productivity.

Two separate (ID: low/high) x 2 (VAL: low/high) ANOVA's were also performed using firstly the third instrumentality relationship (i.e. the relationship between group outcome and individual outcome) and secondly a mean instrumentality score from the three sub-contingencies for each participant. No significant effects were found for either analysis.

In addition to the three instrumentality factors outlined by the CEM, a further hypothesised relationship between individual effort and group performance was analysed. A 2 (ID: low/high) x 2 (VAL: low/high) ANOVA was conducted. Results revealed a main effect for ID, $F(1,96)=14.99$, $p<0.001$. When ID was low ($M=4.70$) participants felt their effort has less of an effect on group performance than when ID was high ($M=5.46$). A main effect for VAL was also revealed, $F(1,96)=9.34$, $p<0.005$. When VAL was low ($M=5.38$) participants felt their effort has more of an effect on group performance than when VAL was high ($M=4.78$). Both of these main effects are similar in magnitude and direction to that of the first instrumentality factor. Examining the relationship between the hypothesised contingency and the first instrumentality factor reveals a strong positive correlation ($r=0.58$, $N=100$, $p<0.05$), indicating that these two measures may in fact be assessing a single construct.

Valence. The valence contingency was split into two sub-categories: individual level valence (i.e. the importance of task outcome to the individual) and group level valence

(i.e. the importance of task outcome to the group). Considering the individual level valence item, a 2 (ID: low/high) x 2 (VAL: low/high) ANOVA revealed a significant main effect for ID, $F(1,96)=6.81$, $p<0.05$. Greater importance was placed on task outcome to the individual when ID was high ($M=5.52$) as compared to when ID was low ($M=4.94$). There were no other significant effects.

A second 2 (ID: low/high) x 2 (VAL: low/high) ANOVA was conducted, this time employing group level valence as the dependant variable. The analysis revealed a significant main effect for VAL, $F(1,96)=7.29$, $p<0.01$, indicating that participants felt task outcome to be more important to the group when VAL was high ($M=5.64$) than when VAL was low ($M=5.64$). No other significant effects were found.

Efficacy Ratings

Participants were asked to rate the abilities of both themselves and the rest of the group as a whole at performing the physical task involved in the procedure. A 2 (ID: low/high) x 2 (VAL: low/high) x 2 (Performance Condition: individual/collective) ANOVA with repeated measures on the third factor was performed on ratings of self-efficacy. A significant main effect for performance condition was revealed, $F(1,96)=15.60$, $p<0.0001$, indicating that participants felt they would perform the collective task ($M=5.04$) better than they would perform the individual task ($M=4.65$). No other significant effects were revealed.

A 2 (ID: low/high) x 2 (VAL: low/high) ANOVA performed on ratings of group efficacy revealed a main effect for VAL, $F(1,96)=11.43$, $p<0.001$. Participants in low VAL ($M=5.14$) groups rated the group as less able than participants in high VAL groups ($M=5.70$). No other significant effects were revealed.

An index of perceived co-worker ability relative to that of the individual was created by calculating difference scores between perceived self efficacy and group efficacy. This index had a mean value of -0.38, a standard deviation of 0.99 and ranged from -3 to 2. Negative index scores represent an individual who perceives the rest of the group to be relatively more able than themselves, while a positive score represents an individual who perceives themselves to be relatively more able than the remainder of the group. A 2 (ID: low/high) x 2 (VAL: low/high) ANOVA performed on ratings of

co-worker ability revealed a significant main effect for VAL, $F(1,96)=5.03$, $p<0.05$. This finding indicated that although across all conditions there was a trend of negative co-worker ability index scores (i.e. overall participants rated the group as more able than themselves), participants in low VAL conditions (M=-0.16) reported less of a relative ability difference between themselves and the group than participants in high VAL conditions, (M=-0.60). Examining the relationship between co-worker ability and the degree of social loafing exhibited revealed a significant positive correlation, (r=0.25, N=100, $p<0.05$), indicating that as perception of co-worker ability relative to the individual decreases (i.e. co-worker index scores increase) the degree of social loafing exhibited increases.

Group Cohesion

Participants were required to complete the Group Environment Questionnaire in order to assess group cohesion and its relationship to social loafing. Each subscale of the GEQ was analysed separately on the basis of item total scores:

Attraction to Group–Social. A 2 (ID: low/high) x 2 (VAL: low/high) ANOVA revealed a main effect for ID, $F(1,96)=5.41$, $p<0.05$. Participants in low ID conditions (M=36.00) reported a greater sense of social attraction to the group than those in high ID conditions, (M=32.92).

Attraction to Group–Task. A 2 (ID: low/high) x 2 (VAL: low/high) ANOVA revealed no significant effects.

Group Integration – Social. A 2 (ID: low/high) x 2 (VAL: low/high) ANOVA revealed a significant main effect for ID, $F(1,96)=8.42$, $p<0.05$. Participants in low ID conditions (M=26.08) reported a greater sense of social group integration relevant to social situations, than those in high ID conditions, (M=23.00).

Group Integration – Task. A 2 (ID: low/high) x 2 (VAL: low/high) ANOVA revealed a significant main effect for VAL, $F(1,96)=8.42$, $p<0.05$. Participants in high VAL conditions (M=32.16) reported a greater sense of group integration relevant to the task at hand, than those in low VAL conditions, (M=29.42). A significant interaction was

also revealed, $F(1,96)=5.18$, $p<0.05$. Post hoc analysis (Tukey, $p<0.05$) indicated that for the low ID groups there was a significant difference between ratings of task related group integration when VAL was low ($M=28.56$) as compared to when VAL was high ($M=33.80$). There were no other significant differences present.

Examining the relationship between cohesion and social loafing revealed no significant correlations between any of the subscales and the degree of loafing exhibited. This was true for both correlations within each experimental condition, and when all conditions were collapsed together.

Individual Differences

To this point, the analyses carried out on the data collected have focused on differences at a group level. Between group comparisons have been made in order to identify effects of the independent variables, ID and VAL. Although the experimental design employed necessitates the use of such statistics, and significant effects were revealed, it appears some information may be obscured by the use of these methods. More specifically, individual level differences may be present within conditions, which have not been detected by the analyses reported. It is reasonable to assume that, if in fact these differences do exist, they could provide possible explanatory mechanisms for the effects found.

Individual performance levels (i.e. scores on the index of social loafing) were examined. Figure 5 shows the comparative distributions of performance level by condition. It can be seen that although each distribution differed in respect to the incidence and magnitude of productivity losses and gains, within each condition there were relative differences in performance, there was a range of performance levels within each condition. There were 'low' and 'high' performers in each condition relative to the other participants in that particular condition. On this basis, it was decided to examine the relationships between variables within each performance level.

Within each condition, the degree of social loafing exhibited by each participant was ranked and the 33rd and 66th percentiles identified. Participants whose loafing index scores fell below the 33rd percentile were identified as 'low performers' and conversely participant's whose loafing index score fell above the 66th percentile were

identified as 'high performers'. Participants whose loafing index score fell between the 33rd and 66th percentiles were omitted from this analysis. When the split groups were collapsed across conditions two distinct group were formed; low and high performers, each relative to the other participants in a specific condition. For each group, social loafing index scores were correlated with participant's ratings of the CEM contingencies.

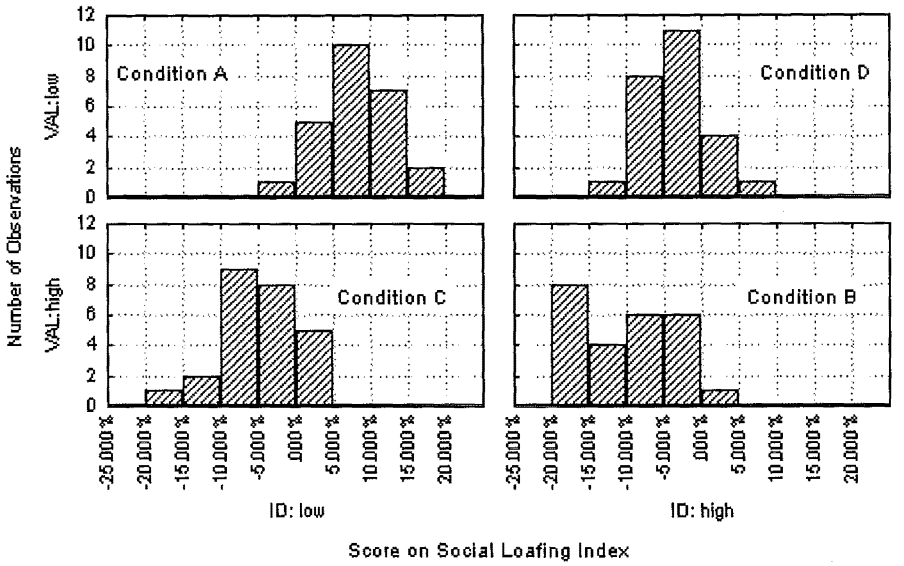

Figure 5: Histograms categorised by condition displaying the relative distributions of the degree of social loafing exhibited (i.e. scores on social loafing index).

Low Performers. A significant correlation was revealed between the perception of group ability and degree of social loafing exhibited, (r=-0.43, N=32, p<0.05). A further significant correlation was revealed between the perception of co-worker ability relative to their own (i.e. co-worker index score) and the degree of social loafing exhibited (r=0.37, N=32, p<0.05). These findings indicate that when the rest of the group is seen as able in general, loafing decreases; while when the rest of the group is seen as less able than the individual in question, loafing increases. No other significant relationships were revealed.

High Performers. A significant correlation was revealed between motivation force and the degree of social loafing exhibited (r=-0.45, N=32, p<0.05). As predicted by the CEM, as motivation force increased, loafing decreased. This finding was qualified by

significant correlations between the mean instrumentality rating[9] (r= -0.45, N=32, p<0.05), individual valence rating (r=-0.39, N=32, p<0.05), group valence rating (r=-0.39, N=32, p<0.05) and mean valence rating (r=-0.43, N=32, p<0.05). As the magnitude of these contingencies increased, the degree of social loafing exhibited decreased. There was also a significant correlation between the degree to which the individual felt their collective performance was being evaluated and the degree of social loafing exhibited (r=-0.36, N=32, p<0.05). The greater the extent of perceived individual evaluation, the less they loafed. No other significant relationships were revealed.

[9]Correlations between the individual instrumentality relationships and the degree of social loafing exhibited all approached statistical significance and were in the same direction as that between the mean instrumentality rating and social loafing.

CHAPTER V
DISCUSSION

The results of this study showed mixed support for the hypotheses. Firstly, in support of hypothesis 1, social loafing was exhibited when both identifiability and task valence was low. Participants in this condition exerted significantly less effort collectively than individually. Furthermore, increases in either task valence or identifiability led to an attenuation of the loafing effect. In addition, an interaction between these two independent variables was also revealed. This indicated that when both identifiability and task valence were high, the degree to which social loafing was attenuated was higher than for either variable alone. In fact, comparison between individual and collective performance for conditions where either identifiability or task valence, or both variables together were high, revealed that not only were loafing effects attenuated, but productivity gains were recorded. That is, individual contributions to collective performance were superior to that for individual performance conditions. These results were consistent with the previous social loafing literature in terms of the moderating effect of identifiability and task valence on social loafing.

In terms of the CEM contingencies, the hypotheses were not directly supported. There were no significant differences between conditions in terms of the instrumentality contingency as a whole. In this respect, no support was found for the prediction that perceived instrumentality would be higher in conditions within which social loafing was not exhibited. There were no significant differences between conditions in terms of perceived instrumentality. However, when the individual instrumentality contingencies were considered, some support was found. When identifiability was high, the perceived relationship between individual performance and group performance was higher than when identifiability was low. This indicates that the individuals felt that their own performance had more impact on that of the group, and therefore had more effect on the outcome of the task for them personally when identifiability was high than when it was low. Furthermore, the perceived relationship between group performance and group outcomes was also seen to be similarly influenced by the degree of identifiability present. When identifiability was high, group performance was perceived to have more impact on group outcomes than when identifiability was low. Combined, these two

results suggest that some support has been demonstrated for the influence of the moderator variables on two of the components of the instrumentality contingency. Although it is unclear why these differences did not result in an effect for the overall instrumentality contingency, it was found that when identifiability was high, the perceived influences of individual performance on group performance, and group performance on group outcomes were stronger than when identifiability was low. Thus, hypothesis 2 received partial support.

Interestingly, significant effects were also found for the task valence variable, but in the opposite direction to those found for identifiability. When task valence was high, the strength of the perceived relationships between both individual performance and group performance, and group performance and group outcomes were weaker than when task valence was low. The direction of these effects was the opposite to that predicted. Initially it seems as though the predictions made on the basis of the CEM were not only refuted, but also found to be in the wrong direction. However once these results are considered in context with a further finding which indicated that when task valence was high, co-workers are seen as more able, a possible explanation becomes apparent. Given the findings in the existing literature that state the when co-worker ability is high individuals tend to loaf, it seems that in this situation, an analogous effect has occurred, thereby allowing interpretation along these lines. If an increase in task valence results in increases in the perception of co-worker ability, then it follows that individuals may feel less personal influence on group performance due to their relative lack of ability. In other words, the degree to which the individual feels they can contribute to the group may be reduced as they see themselves as less able. In addition, the increase in task valence may be accompanied by the notion that due to a reward being offered, the rest of the group will be motivated to exert more effort, and therefore the individual does not need to. This type of effect has been termed as 'the free-rider effect' (Kerr, 1983), whereby individual effort is reduced if the effort of team-mates is perceived as sufficient in order to produce the desired outcome.

The hypothesised relationship between individual effort and group performance revealed similar patterns to the established CEM contingency between individual effort and group performance as detailed above. Identifiability resulted in an increase in the

perceived influence of individual effort on group performance. Furthermore, high task valence resulted in the perception of the relationship between individual effort and group performance to be lower than when task valence was low. Added to this was a strong positive correlation between the hypothesised relationship and the CEM contingency between individual performance and group performance. In sum, these results suggest that the hypothesised relationship measured similar constructs to those which already feature as part of the CEM, and as such adds little to the explanatory power of the model.

The final CEM contingency to reveal significant effects was that of outcome valence. This contingency was split into two components, individual level valence, or importance of the outcome to the individual; and group level valence, that is the perceived importance of the outcome to the group. In terms of individual level valence, greater importance was placed on the outcome when identifiability was high. It follows that as a consequence of individual inputs being identifiable, individual contributions to the outcome are also to a degree identifiable. Thus, if it is possible to evaluate the extent to which each individual is responsible for the outcome of the task, then importance of the outcome will increase as a result of the desire to avoid presenting an unfavourable impression of effort to the other group members. The second component of outcome valence, group level valence, showed significant increases when task valence was high as compared to when task valence was low. This effect results from the availability of an extrinsic reward, in this case money. Logically, if a valued reward is available on the basis of group outcome, the importance of the outcome to the group as a whole will increase.

When considering the additional measurements taken, the results on the whole show mixed amounts of support for the previous research. Subjective estimates of both effort and performance were consistently lower for coactive than collective performance, regardless of whether social loafing was exhibited or not, indicating that when individuals did loaf, their estimations of performance were inaccurate. There are two possible explanations for such effects when social loafing is exhibited; firstly individuals are unwilling to report exerting less effort when performing collectively in order to project a socially desirable impression of themselves; and secondly individuals

are unaware that they are engaging in social loafing. This second explanation would tend to suggest that social loafing is not a conscious process, and as such individuals are not able to accurately describe their behaviours when performing collectively. However, given both the present set of results and the past literature, there is not sufficient information in order to draw conclusions the accuracy of either explanation. As such, there is a need for further investigation in the area, in particular addressing issues pertaining to the level of awareness an individual has when engaging in social loafing.

In terms of group valence there was no direct relationship found between cohesion and social loafing. Although this result was in contradiction to previous research (Karau & Williams, 1993), closer examination reveals some inconsistencies in the data obtained. Unexpected differences were found in terms of between condition comparisons of the subscales of the GEQ. This may indicate that cohesion varied because of the experimental manipulations, and as such make the results obtained somewhat inappropriate in terms of addressing the issues relevant to the present research. To this extent, the validity of drawing inferences from these results is limited.

Ratings of self and group efficacy served to enable the formation of an index of perceived co-worker ability. A positive relationship between indexed co-worker ability scores and social loafing was revealed, indicating that individuals loafed more when they perceived co-worker ability to be low in relation to themselves. This finding is contrary to that found in previous research, in that loafing has been consistently shown to be reduced when co-workers are perceived to be low in ability, (Karau & Williams, 1993). While it is unclear why this result is not only inconsistent with the previous literature, but in the opposite direction, some indication may be given by the fact that the most robust findings have employed a design whereby the perception of co-worker ability has been manipulated experimentally (e.g. Hardy & Crace, 1991; Williams & Karau, 1991). Experimental manipulation of cohesion results in not only causal explanations being valid, but also the reduction of third variable problems and confounding. Furthermore, previous research in this area has generally used strangers as participants, while the participants in the present investigation were members of intact groups, and thus as a result of past experiences, may have had a large amount of

relevant information on which to base their judgements. Alternatively, the accuracy of the surreptitious method of assessing the perception of co-worker ability employed in the present research could be questioned, but more significantly, the confounding factor of the independent variables may have influenced results. In fact, there were significant differences revealed between co-worker index scores for low and high task valence groups, with no apparent theoretical reasoning why this may have occurred. As such, it appears that the relationship between social loafing and perceived co-worker ability may have been confounded by the manipulation of the independent variables.

The final findings to be discussed are those which were revealed when analyses were conducted at an individual level. After grouping participants on the basis of the degree of loafing they exhibited relative to the other participants in their respective condition, a negative relationship between motivation force and social loafing was found for the 'high performers' group. This finding is of considerable importance in the context of this study as it is the first occasion whereby the specific predictions made by the CEM were upheld. Participants in the 'high performers' group who are high in motivation force loafed to a lesser degree. This result was not present in the 'low performers' group. Low performers did, however, exhibit a significant negative relationship between perception of group ability and loafing level, as well as a positive relationship between loafing and perception of co-worker ability relative to their own ability. This implies that when the rest of the group is seen as able in general, loafing decreases while when the rest of the group is seen as less able than the individual in question loafing increases. Although, again this pattern is not in line with previous research it may be suggestive of factors contributing to the differences exhibited between low and high loafing groups.

One obvious explanatory mechanism points to individual differences or predispositions toward certain behavioural responses in collective performance settings. Swain (1996) argued that achievement orientation is able to provide an explanation of the social loafing process and demonstrated that this factor of achievement orientation was a mediating factor in terms of loafing levels of subjects performing collectively. Two achievement orientation perspectives have been identified, namely task and ego orientation (Duda, 1992). A task-oriented individual has been characterised as placing

importance on personal performance in reference to past performance, gaining new skills and generally improving personally. Alternatively, an ego orientation centres around performance relative to that of others, that is, success is judged on the basis of demonstrating superior ability to that of coactors. An explanation in terms of achievement orientation seems to fit the present results. It could be argued that the low loafers seem characteristic of ego oriented individuals while high loafers seem to be more task oriented. Performance levels in the low loaf group were related to perceptions of the abilities of the other group members, a more ego oriented approach than the high loaf group whose performance was more related to instrumentality and task importance, arguably a more task oriented approach. As such, it seems that consideration of these results in terms of the individual differences factor of achievement orientation can add explanatory power, and more significantly, provide some direct evidence in support of the CEM as a model of collective performance.

To summarise, the present study demonstrated a social loafing effect, and the attenuation of this effect as a result of increasing either the identifiability of individual contributions to collective performance, or the valence of the task. These results provide further support for the robustness of identifiability and task valence as moderating variables of social loafing as demonstrated by the existing body of literature, (Hardy & Latané, 1986; Harkins & Jackson, 1985; Karau & Williams, 1993; Kerr & Bruun, 1981; Sorentino & Shephard, 1978; Waller, 1996 Williams, Harkins & Latané, 1981; Williams & Karau, 1991; Zaccaro, 1984). Furthermore, although there was no support found for the CEM being a valid predictor of performance, evidence was apparent that suggested some degree of accuracy within this model. Specifically, instrumentality relationships were shown to be sensitive to changes in task related situational variables, in this case identifiability and task valence, as predicted by Karau and Williams (1993). More direct support was found for the CEM when analysis was carried out on the basis of individual levels of social loafing relative to that of the other members in the same performance condition. In this respect, it was found that for 'high performers' there was a negative relationship between the degree of social loafing exhibited and the CEM construct of motivation force. This result provided direct support for the CEM. Additionally, subjective estimations of effort and performance

were in line with that found in previous research, participants failed to report decreases in effort when loafing. Finally the relationships found between cohesion and social loafing, and perceived co-worker ability and social loafing were not in line with the general effects demonstrated by Karau and Williams' (1993) meta-analysis; however methodological issues may preclude the drawing of definitive conclusions from these findings.

Limitations of the Present Research and Suggestions for Future Directions

The present research contains some methodological flaws. Primarily, the problems lie within the design of the experiment. The performance condition referred to as 'collective performance' was not strictly collective in nature. The contribution of individual participants was not combined during the performance of the task. Rather, each group member performed an equivalent task sequentially, a situation more accurately described as coactive performance. As such, the typical social loafing paradigm comparing individual to collective performance was not replicated. Moreover, the paradigm employed was more typical to social facilitation research, and with this comes the confounding factor of presence effects. By simply being present while the individual was performing, coactors served as an audience thereby creating a source of arousal and social impact, which in turn tends to enhance performance, (Cottrell, 1972). Unfortunately, the nature of the data collected (i.e. inclusion of additional CEM contingencies for collective performance, when in fact performance was coactive) preclude any conclusions as to the accuracy of the CEM predicting coactive performance being drawn. However the fact that social loafing was evidenced in this study despite inaccurate simulation of collective performance lends support to the notion that the phenomenon is robust and common to group activity in general, not simply an artefact of a particular experimental paradigm. Future research should employ a truly collective task, such that all individuals perform simultaneously and inputs are pooled to create a single output. For example, a rowing crew provides an ideal opportunity for assessing the attributes of collective performance.

Further methodological problems within the present research involved the manipulation of the task valence variable. There was no consistency between individual

and group performance in terms of no extrinsic reward being offered for high quality individual performance. Furthermore, group performance for conditions whereby task valence was high involved performing the task twice. However, the task was only required to be performed once for individual performance and group performance in the low task valence conditions. This situation created potential problems of both fatigue and practice effects, simply by means of extra task performance. Obviously, any similar future research should control for this anomaly by means of introducing extra performance trials for both individual performance and group performance for low task valence conditions, thereby creating consistency between both performance conditions and experimental conditions. It is predicted that given such adjustments, larger and more robust effects would be found.

The final issue relating to methodology is simply one of order effects. Within the present design there was no counterbalancing for order of task performance. That is, all participants performed individually first, then as a group. In this manner, there is the possibility that fatigue, practice or some other unidentified third variable issue may have confounded the results. This problem is overcome by simply counterbalancing the design such that half of the groups perform individually first, while the other half perform the relay condition first. However there is little to suggest that counterbalancing will effect the results in any significant manner other than increasing effect sizes, as any confounding effects would have been present across all experimental conditions. To this extent, it is suggested that the present design was adequate, however effects may have been dampened by the lack of counterbalancing.

The wording of the questionnaire items measuring the CEM contingencies was also potentially problematic. Primarily it must be asked if simply requiring participants to estimate the relative strengths of the CEM contingencies are an accurate or valid means of assessment. The constructs and relationships used by the CEM to model performance are somewhat abstract in nature, and as such may be unfamiliar to the participants. For example, estimating the extent to which group outcomes influences individual outcomes is difficult if the participant is not familiar with these concepts, and how they to apply them to actual performance. Furthermore, if it is assumed that social loafing is at least in part, a subconscious process, then assessing the CEM by this means

of questionnaire becomes immediately invalid. Accurate responses to the questionnaire items will not be possible as the participant is not consciously aware of their effort allocation strategies, thereby making direct testing of the CEM illogical. It could be argued that even if social loafing is a subconscious process, the individual may still be aware of the relationships between contingencies as specified by the CEM, but not the outcomes they have (i.e. influences on performance). However, this line of reasoning, while theoretically valid, does not resolve the issue regarding the appropriateness of using a questionnaire format to assess the perceived strength of the CEM contingencies.

Alternatively, if it is assumed that social loafing is a conscious, deliberative process, given the problematic nature of questionnaire assessment as outlined above, a more suitable means by which to assess the CEM is possible. If variables are operationalised such that they are seen to influence only one instrumentality relationship in isolation, then greater control is possible. In this instance, direct effects of situational and task related factors on the isolated relationship can be quantified, thereby providing for a more rigid and controlled test of the CEM. However, Williams (1998) reported that attempts to manipulate variables to isolate individual instrumentality contingencies have failed due to the difficulties involved in eliminating the confounding factor of possible influences on the other contingencies.

At present, little research has addressed the issue of whether social loafing is a conscious or unconscious process, or a combination of both. As such, more definitive answers to this issue are required in order for the CEM to be tested fully.

Implications of this Research in Terms of the Social Loafing Phenomenon

Of considerable note in terms of the present set of results is the fact that several factors may interact to produce an associated response in performance. More specifically, it has been shown that the manipulation of a given variable may have wider ramifications on performance than that proposed theoretically. For example, the present research manipulated task valence with the intention of increasing the perceived salience of the task by offering an extrinsic reward, which in turn was proposed to influence performance. In reality, in addition to the desired effect, differences in task valence also resulted in differences in perceived co-worker ability, subjective estimates

of group performance and perception of cohesion in terms of task related group integration. Therefore, this situation tends to suggest that a single variable cannot, or more accurately should not be isolated and consequently attributed to explaining changes in behaviour. It is only when the combination of a number of influences is considered that valid interpretations are able to be to be made. This lends support to the notion that social loafing cannot be explained as the consequence of a single construct but rather the result of a series of interacting variables. To this extent, Swain (1996) has suggested that social loafing research would benefit from a more interactionist approach, incorporating a wider range of factors including both situational and personality variables into experimental designs.

Taking this notion further, it is proposed that social loafing is not an isolated phenomenon with unique properties and characteristics, but is the result of the combination of specific task, situational and personality variables in the same manner as other group-based phenomena such as social facilitation. Given the somewhat serendipitous finding that social loafing was still evidenced when the design employed resembled the typical social facilitation paradigm, it seems logical to suggest that these phenomenon could represent divergent ends on some form of group process continuum. The fact that the introduction of high levels of individual identifiability and task valence led not only to the attenuation of social loafing, but also significant increases in individual contributions to group performance when compared to performing alone suggests that social loafing should not be considered in isolation of other group process phenomenon. Productivity gains were exhibited under some performance conditions, implying that social loafing, is not necessarily the product of collective action but of a set of specific collective performance conditions. Given distinctly separate sets of situational conditions for the same group performing the same task, under the same task structure, there could feasibly be two distinct performance outcomes, for example in one instance productivity loss, in another productivity gains. Furthermore, under identical performance and situational conditions, there may be marked differences between individual behavioural responses resulting from these differences, and possibly due to differences in personality constructs. As such, with these situations in mind it appears to make little sense to treat group phenomena such as social loafing and social

facilitation as distinct and unrelated. Thus, it is proposed that social loafing is a specific behavioural response to a combination of performance and personality factors which results in a decrease in motivation when performing collectively.

The implications of such a line of reasoning on the CEM are somewhat inconsequential, as this model predicts the degree to which an individual will allocate effort when in a collective performance context, not social loafing as such. However, Steiner's (1972) notions of group process do not account for increases in performance when performing collectively. Thus, on the basis of the preceding reasoning it is proposed that the relationship between actual and potential productivity be reconceptualised from:

ACTUAL PRODUCTIVITY (AP) = POTENTIAL PRODUCTIVITY (PP) – PROCESS LOSS

to:

AP = PP – PROCESS LOSS + PROCESS GAIN

The introduction of the concept of 'process gain' at this point recognises the fact that collective performance, while often resulting in decreases in effort when compared individual or coactive performance, can also create situations of increases in effort and associated performance. Furthermore, this equation also acknowledges that process losses and process gains can exist simultaneously within the same collective performance. For example, environmental and personality variables can interact to produce both losses and gains in process within the same situation. Thus, it can be seen that productivity losses are not necessarily a result of collective action, but gains in productivity are also inherently possible. That is, social loafing does not by definition, occur in the absence of other group phenomena when performing collectively.

The practical implications of this research in terms of the specific context of team sports are numerous. Beyond suggestions of increasing individual identifiability and task valence in order to overcome social loafing, and given the assumption that social loafing is only one end of a continuum of group process effects, some wider inferences can be made. If productivity losses are the result of a certain combination of performance and personality factors and productivity gains result from similar processes involving different factors, and then it would seem more appropriate to simulate conditions by which performance is facilitated rather than introduce additional factors in order to overcome productivity losses. In other words, given there is inherent potential

within groups, and in this case sports teams, to both decrease and increase effort when performing collectively, it seems practical to identify and promote conditions which evoke productivity gains instead of accepting that productivity losses will occur and introducing moderators to overcome this effect.

In conclusion, it has been demonstrated that social loafing can be problematic to sports teams in terms of the realisation of potential performance levels. Furthermore, identifiability and task valence were shown to significantly moderate social loafing to the extent that group performance exceeded individual performance when either variable was manipulated to be high. In terms of the CEM, partial support was shown for the validity of the model as a predictor of individual effort in collective performance settings. However, methodological limitations precluded definitive conclusions. Finally, the phenomenon of social loafing has been discussed in light of the view that it is not a unique, isolated result of collective performance, distinct from other group-based effects such as social facilitation, but a specific response to a combination of situational and personality factors.

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APPENDIX A

The Group Environment Questionnaire

Thinking about the following list of statements, please indicate how strongly you agree or disagree with each of them. When responding to these items, please consider your team to refer to the people you are performing this study with.

1. I do not enjoy being part of the social activities of this team.

Disagree strongly								Agree strongly
1	2	3	4	5	6	7	8	9

2. I am not going to miss the members of this team when the season ends.

Disagree strongly								Agree strongly
1	2	3	4	5	6	7	8	9

3. Some of my best friends are on this team.

Disagree strongly								Agree strongly
1	2	3	4	5	6	7	8	9

4. I enjoy other parties more than team parties.

Disagree strongly								Agree strongly
1	2	3	4	5	6	7	8	9

5. For me this team is one of the most important social groups to which I belong.

Disagree strongly								Agree strongly
1	2	3	4	5	6	7	8	9

6. I am not happy with the amount of playing time I get.

Disagree strongly								Agree strongly
1	2	3	4	5	6	7	8	9

7. I am unhappy with my team's level of desire to win.

Disagree strongly								Agree strongly
1	2	3	4	5	6	7	8	9

8. This team does not give me enough opportunities to improve my personal performance.

Disagree strongly								Agree strongly
1	2	3	4	5	6	7	8	9

9. I do not like the style of play on this team.

Disagree strongly								Agree strongly
1	2	3	4	5	6	7	8	9

10. Members of our team would rather go out on their own than get together as a team.

Disagree strongly								Agree strongly
1	2	3	4	5	6	7	8	9

11. Our team members rarely party together.

Disagree strongly								Agree strongly
1	2	3	4	5	6	7	8	9

12. Our team would like to spend time together in the off season.

Disagree strongly								Agree strongly
1	2	3	4	5	6	7	8	9

13. Members of the team do not stick together outside of practices and games.

Disagree strongly								Agree strongly
1	2	3	4	5	6	7	8	9

14. Our team is united in trying to reach its goals for performance.

Disagree strongly								Agree strongly
1	2	3	4	5	6	7	8	9

15. We all take responsibility for any loss or poor performance by our team.

Disagree strongly								Agree strongly
1	2	3	4	5	6	7	8	9

16. Our team members have conflicting aspirations for the team's performance.

Disagree strongly								Agree strongly
1	2	3	4	5	6	7	8	9

17. If members of our team have problems in practice, everyone wants to help them so we can get back together again.

Disagree strongly								Agree strongly
1	2	3	4	5	6	7	8	9

18. Our team members do not communicate freely about each athlete's responsibilities during competition and practice.

Disagree strongly								Agree strongly
1	2	3	4	5	6	7	8	9

APPENDIX B

Collective Effort Model Scale

You are invited to participate in the research project: *Group Dynamics in Team Sports* by completing the following questionnaires. The aim of this project is to investigate the nature of the group dynamics which take place when individual athletes interact in a team environment. The questionnaire is anonymous, and you will not be identified as an informant without your consent. You may at any time withdraw your participation, including withdrawal of any information provided. By completing the questionnaire, however, it will be understood that you have consented to participate in the project, and that you consent to publication of the results of the project with the understanding that anonymity will be preserved.

A number of items within this questionnaire refer to the terms: "performance" and "outcome". These two terms are intended to refer to separate and distinct notions. *Performance* is referring to how well you or the team executes the task at hand, while *outcome* refers to the result of your efforts. For example, a tennis player may *perform* very well by playing very good shots, covering the court well and the like, yet the *outcome* for him/her may be poor in that he/she may lose the match because he/she was playing a more skilled opponent, had bad luck etc. Alternatively he/she may *perform* very poorly, and not play as well as he/she can, but the *outcome* may be good for him/her if he/she still win the match despite his/her mediocre level of play.

INDIVIDUAL ASSESSMENT: ***(PRE-TASK)***
You are about to complete a timed run by yourself. With this task in mind please answer the following questions:

1. How well do you feel you will perform this task?

Poorly						Very well
1	2	3	4	5	6	7

2. To what extent do you think the amount of effort you exert on the task influences the quality of your own performance?

No influence at all						Total influence
1	2	3	4	5	6	7

3. To what extent do you think the quality of your performance influences the outcome of the task for you?

No influence at all						Total influence
1	2	3	4	5	6	7

4. How important is it to you that you perform well on this task?

Not important at all						Extremely important
1	2	3	4	5	6	7

INDIVIDUAL ASSESSMENT: ***(POST-TASK)***

Considering the task you have just completed, please answer the following questions:

1. Could you estimate, as a percentage of the total amount of effort you think you could have put in, how much effort you exerted on this task? _____%

2. How well do you feel you performed this task?

Poorly Very well

1 2 3 4 5 6 7

3. To what extent do you think your performance on this task was being evaluated?

Not evaluated at all Fully evaluated

1 2 3 4 5 6 7

GROUP ASSESSMENT: ***(PRE-TASK)***

You are about to complete a timed relay as a group. With this task in mind, please answer the following questions:

1. How well do you feel you will perform this task?

Poorly Very well

1 2 3 4 5 6 7

2. To what extent do you think the amount of effort you exert on the task influences the quality of your own performance?

No influence at all Total influence

1 2 3 4 5 6 7

3. To what extent do you think the amount of effort you exert on the task influences the quality of the group's performance?

No influence at all Total influence

1 2 3 4 5 6 7

4. To what extent do you think the quality of your performance influences the quality of the group's performance?

No influence at all Total influence

1 2 3 4 5 6 7

5. To what extent do you think the group's performance influences the outcome of the task for the group as a whole?

No influence at all Total influence

1 2 3 4 5 6 7

6. To what extent do you think the outcome of the task for the group influences the outcome of the task for you personally?

No influence at all Total influence

1 2 3 4 5 6 7

7. How important is it to you that you perform well on this task?

Not important at all Extremely important

1 2 3 4 5 6 7

8. How important is it to you that the group performs well on this task?

Not important at all — Extremely important

1 2 3 4 5 6 7

9. How well do you feel the rest of the group will perform this task?

Poorly — Very well

1 2 3 4 5 6 7

GROUP ASSESSMENT: ***(POST-TASK)***

Considering the task you have just completed, please answer the following questions:

1. Could you estimate, as a percentage of the total amount of effort you could have put in, how much effort you exerted on this task? _____%

2. How well do you feel you performed this task?

Poorly — Very well

1 2 3 4 5 6 7

3. How well do you feel the group performed this task?

Poorly — Very well

1 2 3 4 5 6 7

4. To what extent do you think your performance on this task was being evaluated?

Not evaluated at all — Fully evaluated

1 2 3 4 5 6 7

5. To what extent do you think the group's performance on this task was being evaluated?

Not evaluated at all — Fully evaluated

1 2 3 4 5 6 7

6. To what extent do you think how well the team performs on tasks like this one is useful in predicting how well they perform in their actual sport?

Poor predictor — Excellent predictor

1 2 3 4 5 6 7